Gas Journal

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Editorial Notes

Fuel Policy

PARLIAMENT re-assembled on Thursday last, and, as was to be anticipated, reference to the Government's proposals in regard to the introduction of new legislation on electricity and coal was made in the King's Speech at the State Opening yesterday.

It is, as Sir David Milne-Watson emphasized so strongly in his Address at the recent Conference of the British Commercial Gas Association, of vital concern to the nation that in any legislation of the kind due consideration should be given to the interests of the Gas Industry and that no provisions should be passed which might hamper or handicap it in the service it is rendering to the community. The importance of the Gas Industry must be brought home to everyone concerned with the government of this country; otherwise disastrous follies are likely to be committed. In the publication of the McGowan Report on Electricity Distribution last year, and when the Government came forward this year with a further scheme of organization, some thought of final objects, some recognition of the existence of other industries, might, as Sir David said, have been expected. None has been found. The McGowan Report " moved to one end—unqualified and unconditional—the increase of electrical sales. The use of promotional tariffs side by side with high flat rates, to drive the consumer to new forms of consumption, was specifically advocated, without a thought for the ultimate effect of such developments on the consumer, on other fuel industries, and indeed in some respects on the electricity industry itself. Nothing whatever in the recently issued White Paper qualified this sectional attitude."

It is earnestly to be hoped that proper weight will be given to the outcome of the recent large-scale Parliamentary Enquiry from which the Gas Industry emerged with all the rights it has ever claimed positively vindicated. At the present juncture the findings of the Joint Committee of the House of Lords and the House of Commons should be brought into the limelight. After an exhaustive enquiry which was none of the Gas Industry's seeking, the Committee recognized the Industry as one of vital national importance, essentially irreplaceable either in peace or war, that the Industry is not a monopoly and is entitled to a treatment at the hands of public authorities that is no more restrictive than that enjoyed by its principal competitors. " As between the competitors for public custom in the supply of light and heat," the Committee reported, " there is no justification on grounds of public policy for laying a special handicap on gas." The Committee did not suggest that the Government should intervene to support the Gas Industry in its competition with electricity, " but it is," they suggested, " contrary to public interest to lay burdens on gas to which electricity is not subject or even to permit gas as the older of two competitors to suffer any longer than is necessary from adhesions of restraint because of a monopoly it once enjoyed but has lost." In essence the Committee pointed out to the Government that it would be a national disaster if there were any adverse effect on the Gas Industry.

Any impartial review of the activities of the Gas Industry could only point to the folly of lending support to the electricity industry at the expense of gas. False steps are bound to be taken, however, if the Government fail in their recognition of the economic importance of the Gas Industry and its flexibility in meeting requirements at a time of national emergency. Sir David Milne-Watson has pointed, for example, to the enormous capital cost which would be incurred were the electricity industry to be equipped to meet the Sunday cooking peak—a cost at least equal to that of the country's re-armament programme. Certain of the community's requirements can best be met by electricity, but in the huge field of domestic and industrial heating needs can most economically and satisfactorily be met by the Gas Industry. The relatively high rates of electricity for lighting enable current for other purposes to be sold at much lower rates; but any wholesale incursion of electricity in the heating field must result in greater all-round cost of electricity to the public. In its proposals for new electricity legislation the Government have the opportunity of formulating a balanced plan for the three great fuel industries of coal, gas, and electricity. If they neglect the claims of the Gas Industry, aiding electricity at the expense of gas, the public and the nation will inevitably be losers.

Examinations

"VAGUE expressions should be avoided. . . . Answers should be more concise. . . . Sketching still needs more attention. . . . Students should be trained to set out their answers in the form of concise notes, stating only the facts asked for." These quotations are from the Report of the Board of Examiners on the 1937 Examinations under the Education Scheme of The Institution of Gas Engineers, and they have a familiar ring. For years the Board of Examiners have been asking for greater conciseness in students' replies to the questions set in the examinations and for better sketching and a more liberal use of it. In the discussion on last year's Report of the Gas Education Committee it was asked that the Examiners should stipulate what they really want by way of sketches. The same question is asked by Mr. LeFevre, Officer in Charge of Training at Watson House, in his Presidential Address to the London and Southern District Junior Gas Association, which will be found on later pages of our issue to-day. Mr. LeFevre speaks with a great deal of experience as both teacher and examiner, and his provocative Address is sure to meet with wide discussion. His point in regard to sketches is that they should serve as a vehicle of expression to indicate without doubt that the candidate understands the underlying principles of operation of the piece of apparatus he is called upon to describe, and that if his sketch shows that he has grasped clearly the purpose of the apparatus and how it functions, this should be sufficient to satisfy the examiners. In other words, an examination in, say, gas supply should not be regarded as a test in freehand sketching; and in putting forward this idea he emphasizes that he would be the last to advocate any diminution in the standard of draughtsmanship desirable in all technical students.

Our feeling about examinations of the kind is that the student is not allowed sufficient time to answer a whole lot of questions demanding diagrammatic explanations—and, on a point of detail, such aids to the student as a supply of squared paper are not always provided. To expect a candidate to "sketch and *describe fully*" about half-a-dozen items of plant or pieces of apparatus in the course of three hours is, to say the least, to expect a great deal. The effect would be salutary, we suggest, if those who set the questions—this applies to examiners generally—in all cases worked out the examination papers themselves in the time allotted to the candidates, and, having done so, made allowance for the fact that the candidates taking the examination are necessarily in a state of nervous tension and are not answering their own questions.

"Answers should be more concise." In this connection Mr. LeFevre suggests that the length of an answer can be regulated precisely by the method of asking the question. We quote from the Address: "By far the best method is for the examination paper to be prepared with spaces for the answers adjacent to the questions. If an answer requires only one word or a tick or a cross, that is all the candidate has room to put in the appropriate space provided. In short, examination questions should be set so that no doubt is left in the candidate's mind as to exactly what and how much he has to do, and the method of scoring should be made an accurate process of measurement. If this be done we need have no fear of the reliability of examinations." It will, we think, be agreed that for certain defined purposes of limited scope—and we feel sure that Mr. LeFevre appreciates this limitation—the "yes" and "no" type of examination paper has much in its favour. Applied to gas fitting it would be a measure of the candidate's knowledge of his specific subject—or, rather, an index of his memory of the particular things he has been taught in a standardized manner. Examiners would be provided with a standard key to the "correct" solutions. Within its confined limits the system would be foolproof. It would show whether a candidate was a "nit-wit" or whether he had learnt his lesson in the precise manner his teacher meant him to learn it. Such a system would, of course, result in a very coarse grading. If twenty candidates sat for the examination and all twenty spotted the correct solution, all would be in an equal merit class, which, we are quite sure, would be a most inaccurate assessment. By all means let us have conciseness, but an examination should give some idea, however faint, of the capacity of each individual, of his method of approach in solving a problem. Mr. LeFevre, having referred to a question which produced from one candidate an answer on the merits of which seven experienced examiners could not anything like agree, suggests that had it been a simple arithmetical paper there could have been only one correct answer to each question, and the examiners could not have failed to be unanimous in their marking of any individual paper. Surely the method of answering arithmetical questions, the approach towards the solution, counts for something as distinct from the correct answer.

"There must inevitably remain examinations where the essay type of answer is necessary, says Mr. LeFevre, "but these should be confined to examinations in essay writing and the higher examinations in which the candidate is being tested on his ability to think or to express his views." Is it not desirable, however, that to some extent each progressive examination which a student takes should provide some indication of the candidate's ability to think? Would it not be preferable to include in the type of examination advocated by Mr. LeFevre say one question designed to indicate this ability?

Organized Research

A HEARTENING feature in the Gas Industry's activities is the growing appreciation of the value of scientific research which is spreading through the Industry to-day. That it is a source of encouragement to the younger members was well brought out in the thoughtful Presidential Address of Mr. E. T. Pickering, of the Birmingham Gas Department, to the Midland Junior Gas Association. This Address, published on later pages, will be read with much interest, for it sets out so well the viewpoint of the modern Junior. The amendment of the by-laws governing admission to membership of The Institution of Gas Engineers is in this connection greatly to be welcomed, for the insufficient representation of scientific workers employed in the Industry has undoubtedly been a disappointment to many Juniors. In regard to research Mr. Pickering pointed to the effect of chance discoveries on the progress of the Industry—discoveries the result of work for which the Industry had no responsibility. The discoveries of Bunsen and Welsbach, for example, which revolutionized and regenerated our Industry came at a most fortunate time, but no one connected with the Gas Industry of that day would lay credit on that account.

To-day we can no longer tolerate a state of affairs in which chance plays so large a part in determining the course of our future development. Organized research is an essential to progress. Not that organized research can be relied upon to solve any and every problem put

before it, but it does greatly facilitate a systematic investigation of any selected field, in the course of which chemical, engineering, physical, and mathematical minds may be brought to bear on the problem in hand. We have many times pointed to the desirability of tackling problems of this nature from several angles, and Mr. Pickering, in his Address, emphasized the need for this method of approach. As an instance of the fruitful outcome of organized research we had the Communication which Mr. Hollings presented at the Autumn Research Meeting of the Institution last year on the formation of nitrogenous gum during the storage and distribution of gas. That Communication gave the results of an investigation carried out by a team over a number of years. The method of attacking what was a baffling problem, and the manner in which the work was directed and co-ordinated, exemplified the new outlook on applied research. As Mr. Pickering said, relatively few Juniors are called upon to participate actively in research work; it is essential, however, that all should maintain the closest touch with such work, keeping minds receptive to new ideas. "Research of to-day gives birth to the processes we shall operate to-morrow." Competitors are realizing the immense advantages of organized research and marketing policy. The recent activities in the coal industry in this direction are not designed to render easier the displacement of raw coal by alternative fuels, though against this we have the growing desire on the part of the public generally to enjoy—as it can be enjoyed—a cleaner atmosphere.

Standardized Tests

From the general Mr. Pickering turned to the particular, and discussed in his Address certain aspects of the chemist's work in the Gas Industry. He referred at some length to the growing application of standard methods of test in the laboratory. He is with us in the suggestion that, generally speaking, the adoption of standard methods leads to better and more useful work. It is, of course, on occasion argued that standardization of a method may hamper its further development and stifle the development of alternative and possibly better methods, but no British Standard Specification is regarded as in any sense final. Always it is subject to revision, and methods are not standardized until they have been reasonably well developed. Nor is it claimed that in every case the standard method is the best possible. Rather is it the one on which, taking into consideration the standard of accuracy required, and the limitations of laboratories in which the method is likely to be used, there is the greatest common measure of agreement between the qualified representatives of the various interests concerned. With standardized methods it is possible to compare like with like. This is of such obvious importance that disappointment must be felt that standard specifications are not more universally adopted.

It is not generally recognized what a vast amount of work goes into the making of a B.S. Specification. The demands made on the time and energy of those who give their services to the work of standardization are considerable. Mr. Pickering outlined in his Address what is entailed in such a task. He referred to a specification concerning the determination of the swelling properties of coal by means of a simple crucible test, mentioning that during the experimental work 30 different coals were tested by 11 different observers, probably more than 800 individual crucible tests being carried out in addition to a large number of tests made by members of the Committee using alternative methods. Perhaps if the amount of work involved in the bringing-out of a specification were better known, there would be a wider acceptance of the specifications issued. Such acceptance would be to the general good.

Grass Drying

We have called attention previously in these columns to the possibilities of the use of coke in connection with grass drying. Interest in the process and its potentialities continues to grow, and it is satisfactory to note the large amount of work which is being directed to the study of the subject from the administrative, scientific, and economic points of view. The London and Counties Coke Association is, as our readers are aware, fully alive to the likely demand for coke for a process which appears to offer such promise on a large scale, and we have described in the "Journal" coke-fired driers which have been installed with the active co-operation of the Association. A few months ago the Minister of Agriculture expressed in the House of Commons the Government's interest in the scheme, and an article in *The Times* of Monday last shows how far investigation and experimental work has already progressed. For some time the Agricultural Research Council has been paying special attention to grass drying, and more recently the Ministry of Agriculture has been taking the matter up in view of the possibilities of the system from the defence point of view. The Ministry is, according to the article in *The Times*, studying more particularly the prospects of grass drying on a "factory scale." At the research institutes concerned directly or indirectly with nutrition one or other aspect of the grass drying problem is being investigated, and the work is being supplemented by investigations at several of the agricultural colleges, and advisory economists at these colleges are costing a large number of farming units by a standardized method. We point to the widespread attention being paid to grass drying—the colleges where drying outfits are installed are in England, Scotland, and Wales—in view of the desirability of individual gas undertakings taking a keen interest in the development of what may prove to be a large and important outlet for their solid smokeless fuel.

A Tribute from Lord Horder

In our issue of Oct. 13, p. 147, we commented upon an Address by Lord Horder at the Harrogate Conference of the Coal Utilisation Council. Presumably it was that Address he had in mind when he paid a well deserved tribute, in London on Thursday last, to enterprise in the Gas Industry. He was speaking to members of the Wine and Food Society, one of the aims of which is to educate the public in the proper selection and the proper cooking of foods.

In the course of his remarks, on the subject of kitchen consciousness, Lord Horder recalled his previous Address on the psychological and physiological advantages of the open hearth, and, lest the purveyors of other forms of fuel might feel that he had done them a disservice, he said he did appreciate very much, and he was sure that thousands of housewives appreciated even more, the contribution which the Gas Industry was making towards the problem of kitchen consciousness. He was told, he said, that the body which was responsible for that extremely intelligent venture, Kensal House, which he knew very

well, had two hundred trained teachers dealing with the problem of the preparation of food. He was also told, as showing the degree of interest on the part of the housewife, that no less than half a million applications had been received by that body for a cookery book recently issued, and that no fewer than 24,000 women had taken the trouble to fill in a form asking for information on kitchen planning and on cooking.

That, he continued, was an example of what an intelligent industrial body could do, and it was significant of the interest that was taken by the housewife. So that, if he might offer a testimonial which would slightly counteract anything he might have said previously which seemed to reflect on the value of what had been called the " synthetic " forms of heating and cooking, he would like to offer it.

Obituary

The Late David Vass

An Appreciation by James Jamieson

Only last month, at the Autumn Meeting of the North British Association of Gas Managers, Mr. David Vass honoured me in proposing the vote of thanks to our William Young Memorial Lecturer. That was the highest honour I could offer our oldest active member.

In his letter written from Scarborough accepting my invitation, he said: " I am having a holiday here just to break me into the new life of leisure." How characteristic of him starting afresh after 60 years of active service, service which was wholeheartedly given and appreciated, I think, by all who knew him intimately. He has been taken early in his new life; he did not long enjoy his unaccustomed and well-earned leisure.

I think Mr. Vass must have been one of the most active members of our Associations and Institutions in Scotland. By his frequent contributions in the form of Presidential Addresses, Papers, and by the participation in discussions, he showed that he was not content merely to follow a younger generation, but often by personal experience and experiment pointed the way to progress.

Mr. Vass was proud of the Gas Industry, proud of his long connection with it. He was happily devoted to his work and never lost interest in the Undertakings he had served. Notwithstanding his many activities in public, church, and charitable affairs, his work and enthusiasm for gas took pride of place.

In countless ways his passing will be keenly felt. Would that there were many more of the old school like him to carry on.

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The death has occurred after a few weeks' illness of Mr. ROBERT PEASE, Works Manager of the Parkfield Works, Stockton-on-Tees, of Messrs. Ashmore, Benson, Pease, & Co. He was forty years old.

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The General Gas and Electricity Company announce the deaths of two of their local Managers. These were Mr. F. TAYLOR, of the Fordingbridge Gas Company, on Oct. 15, and Mr. JAMES WOOD, of the Wadhurst and District Gas and Coke Company.

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We regret to record the death on Thursday, Oct. 7, of Mr. JOSEPH TOWNSLEY, a Director of the Ashton Gas Company and Mossley and Saddleworth Gas Company.

Mr. Townsley, who had been in failing health since his retirement in October, 1936, from the position of Engineer and General Manager of the Ashton Gas Company, was 70 and leaves a widow, two sons, and two daughters.

He entered the service of the Ashton Gas Company in 1896 as a labourer. He left Ashton in 1903 to take up the position of Superintendent at the Birkenhead Corporation Gas-Works, and in 1907 he returned to Ashton as Engineer and General Manager, which position he held up to his retirement.

* * *

The death took place suddenly on Sept. 20 of Mr. JOSEPH TAYLOR, Secretary of the Ashton Gas Company. He was on holiday with his wife and daughter when he collapsed, and died a few hours after admission to hospital.

Mr. Taylor was 73 years of age, and had served the Company, in different positions on the clerical staff, for 51 years, being appointed Secretary about ten years ago.

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The death occurred on Oct. 23 of Mr. ERNEST F. HOOPER, who was well known to many Gas Engineers, more particularly in the North of England. Mr. Hooper, who was a Director of Messrs. George Waller & Son, Ltd., Stroud, was for many years associated with Messrs. Brotherton, of Leeds, and managed their Sunderland Works. He was a Past-President of the North Eastern Association of Gas Engineers, and later went to reside in Stroud, when he joined the Board of Messrs. George Waller. He took an active interest in local affairs, and was a Director of the Stroud Gas Company.

Personal

Mr. GEORGE DIXON, Engineer and Manager of the Nottingham Gas Department, has been nominated for the office of President of the Nottingham Society of Engineers for the 1937-8 session.

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Mr. F. E. WARD, who has just retired after forty years' service from the position of Engineer and Manager of the St. Helens Gas Department, has been presented with a portable wireless set, a gift from the employees. The presentation was made by Councillor W. Burrows, Deputy-Chairman of the Gas Committee, at a gathering of employees at the New Road Works.

Forthcoming Engagements

Oct.

28.—COKE OVEN MANAGERS' ASSOCIATION.—Annual Dinner, Hotel Victoria, London.

Nov.

2.—I.G.E.—Council, 9.30 a.m.; Council (*continued*), 4.30 p.m.

2 and 3.—I.G.E.—Autumn Research Meeting.

3.—BRITISH GAS FEDERATION.—Annual General Meeting and Dinner, Grosvenor House, Park Lane, W. 1.

4.—S.B.G.I.—Autumn Meeting, May Fair Hotel. Council, 11 a.m.

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4.—MIDLAND JUNIORS.—Visit to Fuel Research Station, East Greenwich.

6.—SCOTTISH EASTERN JUNIORS.—Short-Paper Day at Edinburgh.

10.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting at Gas Industry House, 2.30 p.m. Discussion on " The Importance of Coke Service."

13.—SCOTTISH WESTERN JUNIORS.—Meeting and Paper by D. S. Davies on " Gas as Applied to the Textile Industry."

13.—WESTERN JUNIORS.—Visit to Torquay. Paper on " Practical and Theoretical Aspects of Crude Benzole Recovery," by F. A. Butt.

18.—I.G.E.—Gas-Works Safety Rules Committee, 2.30 p.m.

18.—MIDLAND ASSOCIATION.—Autumn General Meeting, Grand Hotel, Birmingham.

18.—MIDLAND JUNIORS.—Meeting and Paper by E. Haden on " Temperatures."

19.—SOUTHERN ASSOCIATION.—General Meeting, Hotel Victoria, 2.30 p.m. Paper by W. A. Bishop (Croydon) on " Developing the Heating Load with special reference to Gas-Fired Central Heating Installations." Committee meeting precedes at 12 noon.

19.—LONDON AND SOUTHERN JUNIORS.—Annual Dinner and Concert.

20.—YORKSHIRE JUNIORS.—Meeting at York.

23.—LONDON AND SOUTHERN JUNIORS.—Paper on " Heat Utilization in Carbonizing Plant " by J. H. Reber.

(There will be no meeting of the Central Executive Board of the National Gas Council or of the Central Committee of the Federation of Gas Employers during the month of November.)

News in Brief

CURRENT EVENTS IN THE GAS INDUSTRY

A Petition from 300 council house tenants at Cleadon requesting a supply of gas because it is complained the electricity charges are too high for cooking, &c., has been received by the South Shields Town Council.

An Assistant Engineer and Manager is required by the Brighouse Gas Department. Further particulars of the position, which carries a commencing salary of £300 per annum, will be found in our advertisement columns.

The Offer of the British Gas Light Company to install 600-candlepower lamps in King Street, Thetford, without any extra maintenance charge beyond that now paid has been accepted with thanks by the Thetford Town Council.

Applications Are Invited by the Ashton and Mossley and Saddleworth Gas Companies for the position of Secretary and Accountant to the two Companies. Further particulars of the position will be found in the advertisement columns of this issue.

Copies of the Recently Issued British Standard Specification (No. 240-1937, Brinell Hardness Testing (superseding No. 240-1926)) may be obtained, price 2s. each, from the Secretary, The Institution of Gas Engineers, 1, Grosvenor Place, London, S.W. 1.

Large Crowds visited the home service exhibition held in the Wesley School, Farnworth, Lancashire, from Oct. 18 to 22. The exhibition was arranged by the United Kingdom Gas Corporation, who recently acquired the Farnworth and Kearsley Gas Company, and on each day "house full" notices had to be displayed.

Generous Contributions are made annually by the employees of Messrs. Alder & Mackay, Ltd., New Grange Works, Edinburgh, to various local charities. This year a total of £236 has been distributed as follows: Edinburgh Royal Infirmary, £150; Royal Edinburgh Hospital for Sick Children, £45; and Queen's Institute of District Nursing, £41.

A Novel Display at the showrooms of the Alliance and Dublin Consumers' Gas Company in D'Olier Street, Dublin, is attracting great attention. It shows one of the City's new traffic lights in operation against a well-known backcloth and serves the dual purpose of illustrating to the public the way these signals work as well as advertising gas lighting.

The Board of the Imperial Continental Gas Association have resolved that, out of the profits for the half-year ended Sept. 30, 1937, an interim dividend at the rate of 4% (actual) on the £5,600,000 Capital Stock of the Association be paid, less income-tax at 5s. in the £, on Nov. 15 next. The Transfer Books of the Association will be closed from Oct. 27 to Nov. 9, both days inclusive.

Members of The Institution of Gas Engineers are invited to attend a meeting of the Institution of Chemical Engineers at which a Paper on "The Special Areas of England and Wales; Technical and Economic Aspects of the Commissioner's Work," will be presented by Mr. C. H. Boyd, O.B.E., on Tuesday, Nov. 9, at 6 p.m., in the Rooms of the Geological Society, Burlington House, Piccadilly, W. 1.

Cookery Demonstrations and exhibitions of gas appliances are at present being held by three Undertakings in the North. The Rossendale Union Gas Company are holding their sessions in the Mechanics' Institute, Bacup, where a gas match is being given free with every cooker purchased during the exhibition. The Southport Gas Department have arranged for their demonstrations to be held in various halls in the Borough. At Wigan the added attraction of a special programme of films has been included with the demonstrations and exhibition now running in the Court Hall.

The New Showrooms erected at Beeston by the Nottingham Corporation Gas Department, reference to which has already been made in these columns, were opened on Oct. 22. The building, which is a super-modern structure, will provide sales and service facilities for a population of 36,000. The opening ceremony was performed by Mr. W. V. Potts, Chairman of the Beeston and Stapleford Urban District Council, in the presence of members and officials of the Nottingham City Council and members of the Beeston and Stapleford Urban District Council. A civic luncheon followed the ceremony.

The Tenders of the following firms have been accepted by the Middlesbrough Town Council for the supply of gas meters: Messrs. Willey & Co., Ltd., Metropolitan Gas Meters, Ltd., Alder & Mackay, Ltd., and J. Braddock & Co.

The Business Transacted at the recent annual "Sale" at all showrooms of the Newcastle and Gateshead Gas Company surpassed all previous records. Queues began to gather early on the opening morning to take advantage of the special facilities offered to consumers in the form of bargains, concessions, and free hire offers of labour-saving gas appliances. The Company claim to have been the first undertaking in the country to institute a "Sale" as part of their policy sixteen years ago, and each year records have been broken. Last year the "Sale" showed a remarkable increase of 55% in the money value of turnover as compared with the 1935 "Sale," but this year's figures show that this increase has been exceeded by 12½%. The orders secured also constituted a record amounting to 6,000 gas consuming appliances, which, together with non-gas consuming items, brought the total to 12,800. The "Sale" was carried on for a period of two weeks, and the Company issued a special illustrated eight-paged "Gas Company's Sale News" made up in newspaper form and distributed 45,000 copies. Consumers were offered bargains in reconditioned appliances and 12½% discount on all new cookers, fires, &c., purchased, also the first quarter's rent free for cookers, fires, and water heaters, and a rebate of one (or two) quarterly payments on appliances supplied on hire-purchase terms. A feature of the "Sale" was the cookery demonstrations given each afternoon to crowded audiences in the Company's Demonstration Theatre, which added to the number of ladies visiting the showrooms. Very satisfactory results were also obtained by enclosing with the "Sale News" a prepaid postcard . . . "We bring the 'Sale' to your home" . . . whereby customers unable to visit the showrooms could obtain all the advantages of the "Sale" together with helpful advice.

North of England Auxiliary Association

The 35th Half-Yearly Meeting of the North of England Gas Managers' Association (Auxiliary Section) will be held at the Gas Offices, Newcastle-upon-Tyne, at 2.30 p.m. on Friday, Nov. 26, when a Paper will be presented by Mr. R. Aynsley, of the South Shields Gas Company.

British Commercial Gas Association

Southern District Conference at Swindon

The Southern District Conference of the British Commercial Gas Association was held in the Town Hall, Swindon, on Oct. 20, the President of the Conference being Mr. T. Medcalf, Vice-Chairman of the Swindon United Gas Company.

At the morning session an address of welcome was delivered by His Worship the Mayor of Swindon, Alderman J. Newman, which was followed by the Opening Address of the President of the Conference.

In the course of his Address on "Public Health," Sir Percy Alden, Chairman of the British Institute of Social Service, said there had recently been a great awakening with regard to the importance of improving the health of the people and the Government had shown its interest (as it is indeed their responsibility) by setting aside £2,000,000 which would be spread over the first three years and afterwards £150,000 a year to encourage this campaign for physical fitness. The three important steps to which Sir Percy referred were proper nutrition, better housing, pure air, and sunshine. On the subject of nutrition he said he could not too highly praise the action of the B.C.G.A., in co-operation with the Gas Light and Coke Company, in producing a Nutrition Film which had played a large part in the awakening of the public conscience. Then with regard to housing, he drew attention to an interesting fact with regard to the new houses—viz., the large proportion which used gas for cooking and heating. This could be readily seen if one took a journey by train and noticed the amount of smoke given off from the older dwellings as compared with the new. The result was that the Gas Industry was making life in the modern flat or cottage not

only more healthy but far more desirable as a result of the amenities to every-day life.

At the conclusion of the morning session, the delegates were entertained at luncheon on the kind invitation of the Chairman and Directors of the Swindon United Gas Company at the Queen's Hotel. After lunch, the delegates had the choice of three visits—viz., the Great Western Railway Works, the Garrard Engineering and Manufacturing Company's Works, or the Gas-Works.

At the Ladies' Session, which was held in the Town Hall during the afternoon, the chair being taken by the Mayoress, Mrs. L. J. Newman, Mrs. Eileen Murphy delivered an Address entitled "Planning the Home."

In the course of her talk, Mrs. Murphy said that most English housewives worked from 12 to 14 hours a day. If they worked in factories, their hours of work would be limited by law; but there were no Factory Acts in the home. An Englishman's home might be his castle, but an Englishwoman's home was her workshop. Of course, there was another side to the picture. The housewife was her own boss. She could plan her day's work so as to save time and save drudgery. In the old days this was not so easy as it sounded, but to-day there were all sorts of labour-saving inventions that helped to make housework easier. Eleven million Englishwomen to-day were using gas, and if they used it to the full, and planned their work with its help, they could have far more leisure and enjoyment than ever before.

Modern Home Exhibition

North Middlesex Company's Display

An extremely successful Gas Exhibition was held by the North Middlesex Gas Company during thirteen days, Oct. 4 to 16. It was held in the hall at the rear of their spacious showrooms, Church End, Finchley, N. 3. It had been well advertised, and the interest created at its opening continued to the end. The interest lay in the fact that it gave the Chairman, Sir David Milne-Watson, the opportunity of meeting some of the consumers of the latest Company taken over by the South-Eastern Gas Corporation.

On Oct. 4 he presided at the opening ceremony performed by Mr. J. F. Crowder (Member of Parliament for Finchley), who was accompanied by his wife and supported on the platform by the Mayors and Mayoresses of the Boroughs of Hendon and Finchley; the Rector of Finchley and its Charter Mayor and first Freeman of the Borough were also there. Sir David expressed the pleasure it gave him in welcoming such distinguished consumers and then pointed out the object of the Exhibition.

Declaring the Exhibition open, Mr. Crowder sketched the early history of the Company and how it had grown since 1862.

The Mayor of Finchley, in proposing the vote of thanks to Mr. Crowder, referred to the competition between the Gas Company and his Council's Electricity Undertaking, and welcomed the keenness shown by both parties. The Mayor of Hendon seconded the vote of thanks

The special offer of 50% off the first instalment on all orders taken during the Exhibition was a good draw. The Electrolux Stand showing the unit in its skeleton form interested many. The Parkinson Stove Company's exhibit was also of interest, especially their "Renown" cooker, with its slogan "Streamlining Comes to the Kitchen." Messrs. R. & A. Main, Ltd., displayed their popular Sussex cooker and instantaneous water heaters illustrated by hot water running (over illuminated tubes) from a battery of heaters. The miniature film display in the cooker oven attracted much attention. Messrs. Radiation, Ltd., were exhibiting their "Rotary" New World cooker and their gas fire section contained a wide variety of pleasing designs of fires in different coloured finishes. Ascot Gas Water Heaters, Ltd., displayed their various apparatus in working, including their instantaneous boiling water sink heater. The making of tea at the free tea buffet was well supported and great interest was taken in their latest production. Messrs. W. H. Dean & Son gave continuous demonstrations of their popular boilers.

There were each day cookery demonstrations at 3 p.m. and at 7.30 p.m. by well-known experts from Messrs. R. & A. Main, Ltd., the Parkinson Stove Company, Ltd., and Radiation, Ltd., besides washing demonstrations by Messrs. W. H. Dean & Son, Ltd.

The Rotary Club paid official visits, as did the local builders who attended a special morning reception. The ladies of the Rotary Clubs, the Town's Women's Guild, the Conservatives and other such Associations turned up in large numbers to the demonstrations, at the conclusion of which teas were provided. The Cake Baking Competition was a great draw, 300 entries being received, making the judging no easy task.

The display work at the Exhibition was executed by the British Commercial Gas Association Studio in consultation with the North Middlesex Gas Company.

Chartered Gas Engineers

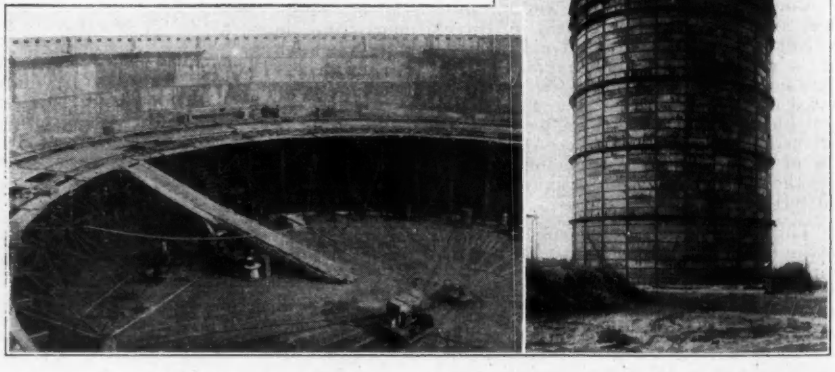
Signing of Passport Declarations

We are informed by the Secretary of The Institution of Gas Engineers that the Chief Passport Officer has, at the suggestion of the Engineering Public Relations Committee upon which the Institution is represented, recognized Chartered Engineers as persons authorized to sign declarations of applicants for British passports. A Member or Associate Member of The Institution of Gas Engineers should, when signing, indicate after his name that he is a Chartered Gas Engineer.

It is stated by the Chief Passport Officer that this authorization does not involve any addition to the list of such qualified persons which is printed on the back of application forms, since the list is not intended to be exhaustive. Steps will, however, be taken to see if the designation "Chartered Engineer" can be added when the form is next reprinted.

A Welded Klonne Holder at Dagenham

Inspection by Gas Engineers

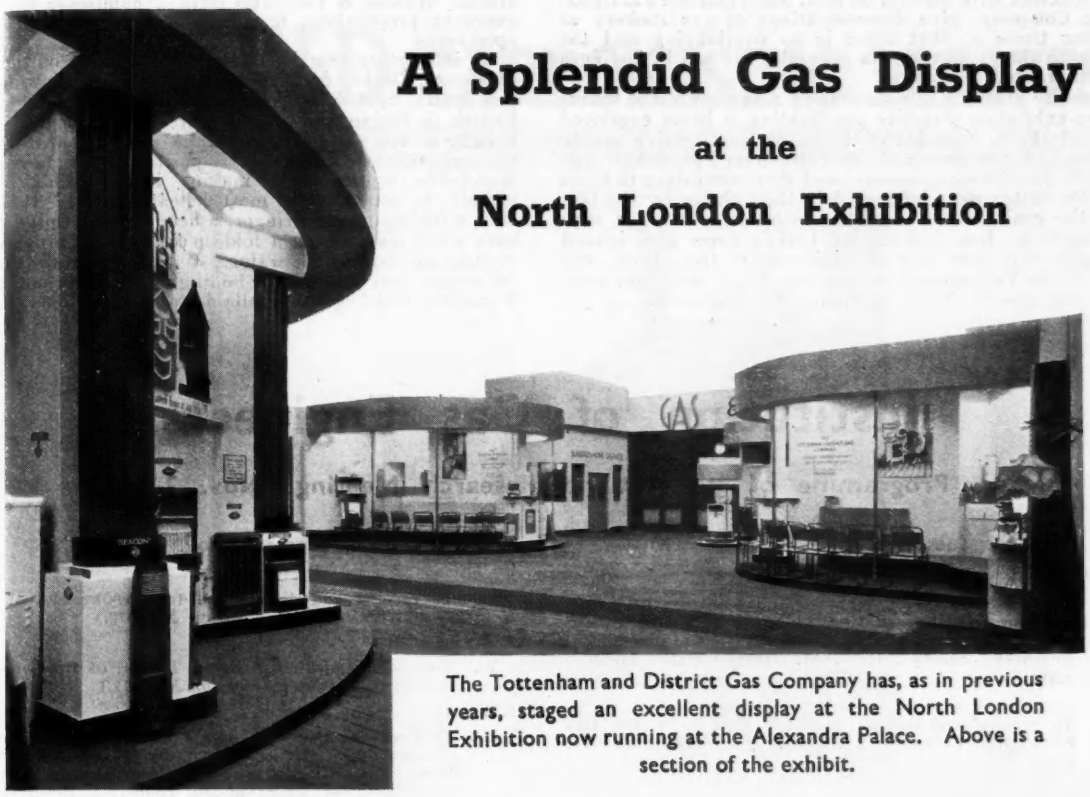


On Oct. 18, 19, and 20 a number of gas engineers, at the invitation of Messrs. Horseley Bridge & Thomas Piggott, Ltd., had the opportunity of inspecting a 2 million cu.ft. Klönne gasholder which the firm is erecting at the works of the Ford Motor Company at Dagenham. We were privileged to be shown over this holder, which, 126 ft. in diameter and 185 ft. in height, is the first of its type of welded construction to be erected in this country. The general design of the holder is similar to that of riveted holders of the type erected by the firm, with the exception that certain modifications were introduced to suit welded construction, and a modified sealing arrangement has been employed. Those taking part in the inspection of the new holder also had the opportunity of making a tour round the interesting works of the Ford Motor Company.

A Splendid Gas Display

at the

North London Exhibition



The Tottenham and District Gas Company has, as in previous years, staged an excellent display at the North London Exhibition now running at the Alexandra Palace. Above is a section of the exhibit.

As in previous years, the Tottenham and District Gas Company have secured a commanding position at the North London Exhibition now running at the Alexandra Palace, for all those entering the exhibition by the East Entrance must pass through the gas exhibit. Co-operating with the Tottenham Company in this fine effort are the Ascot Gas Water Heater Company, Messrs. C. H. Kempton & Co., Ltd., R. & A. Main, Ltd., the Parkinson Stove Company, and So-Fono, Ltd., each firm having a separate stand grouped around the central circular Tottenham stand, which is directly opposite the entrance. To the right of the entrance is a bureau of home service, while on the left is that of home laundry. In between these bureaux is a Parkinson "Renown" cooker slowly rotating on a turntable, a gas supply having been piped with considerable mechanical ingenuity to the cooker, so that its various features can be demonstrated while it continues to rotate.

The Company's stand is a refreshing break-away from the conventional style of gas exhibit. The shape is octagonal and there is a fairly large interior through which visitors may pass, access being gained by doors in two opposite sides. In the very centre of this open interior is a short column bearing the motto "England the Hub of the World," while the walls are covered with gas publicity matter from all quarters of the globe. These posters are arranged in a highly artistic manner and their many bright colours combine to present a most attractive effect, symbolizing the universality of the Gas Industry. Posters have also been used with excellent effect on the exterior of the exhibit, but in this instance they have been cut-out and pasted on so that they have the appearance of being painted on the stand. For this purpose use has been made of B.C.G.A. publicity matter. The interior of the stand is lighted by a Falk, Stadelmann "Clerkenwell" decorative fitting, which enhances the modern note struck by the exhibit. The eight sides of the stand, except those occupied by the entrances to the interior, are devoted to different aspects of gas service. One of these featuring the new 4d. a week gas fire offer is an attractive illuminated display incorporating model houses linking up with Mr. Therm's slogan "I'll Turn Ice Houses into Nice Houses." Another section is devoted to domestic gas boilers. Here are shown a Potterton "Emperor" and an "Ideal" boiler, both fitted to lagged water systems. Attention is drawn to the fact that the Company's prices include full insulation of the tank. In the next section is a display of "Ascot" gas water heaters. A particular attraction of this display is two glass panels in the back wall, behind which tropical fish are swimming in thermostatically-controlled gas heated tanks. Then there is a display of gas cookers, followed by a further section devoted to fires, and finally the section containing the appliances which were the subject of an interesting competition.

An Interesting Competition.

This competition is open only to those residing in the area of the Tottenham Company, and has been organized by the Company in conjunction with three well-known North London newspapers. The competition is free, and all an entrant has to do, after inspecting twenty-two appliances, is to arrange them in order of desirability. The first prize will be awarded to the entrant whose selection most nearly corresponds to the popular vote of all entrants. Each of the six winners in order of merit will

This photograph shows a section of the Tottenham and District Gas Company's very fine display at the North London Exhibition at the Alexandra Palace. As usual, the Company have reserved a large site immediately inside the main entrance of the Palace, so that practically all visitors have to pass through the gas exhibit.

be free to select from the appliances named on the competition form his or her prize. The appliances include modern cookers, water heaters, washing machines, fires, irons, and radiant heaters. The prizes will be presented by Miss Binkie Stuart, the three-and-a-half year old film actress, at the Company's stand on Oct. 29.

Also co-operating with the Tottenham Company are the

Potato Marketing Board and the Herring Industry Board, who together with Messrs. R. & A. Main and the Parkinson Stove Company, give demonstrations of gas cookery at varying times so that there is no overlapping and the visitor to the exhibition can generally succeed in finding a demonstration in progress.

We were gratified to note that on a number of the stands at the exhibition directive gas lighting is being employed to good effect. Notable examples of this lighting are to be found on the stands of the Tottenham Polytechnic and White's Furnishing Company, and it is interesting to learn that the latter were influenced in their choice by the fact that the grain of the wood shows up to advantage with gas lighting. Gas cookers and boiling rings were loaned to many exhibitors and so, quite apart from their own exhibit, the Tottenham Company are doing some very good work for gas in North London. The Company are receiving great support from their authorized dealers, Messrs. Hobbs, Wilson, & Co., who have a handsome exhibit of generous proportions, featuring a large selection of gas appliances.

An interesting new departure is to be found on the stand of Messrs. Barker & Turner, Ltd., who are showing their new "Bar-Spot" washing machine, which is entirely British in design and manufacture. This washer is electrically driven and gas heated. A special feature is that the agitation of the clothes is positive by a moving and detachable copper tank, making it impossible for the machine to tear even the most delicate fabrics. It is fitted with a folding power wringer, a deep cover forming rinsing bath when inverted on a fold-up stand, and provision for heating and boiling the water. With the agitator removed the copper may be used for boiling or steaming operations. A smaller model is also available for manual operation.

Institution of Gas Engineers

Programme of 9th Autumn Research Meeting, Nov. 2-3

Tuesday, Nov. 2, 1937.

10 a.m.

1. The Secretary (W. T. K. Braunholtz) to read the NOTICE convening the Special General Meeting of The Institution of Gas Engineers at The Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W. 1.

2. To receive and discuss the 14th REPORT OF THE GAS EDUCATION COMMITTEE; 1936-37. (*Communication No.* 164.)

3. (*a*) To present DIPLOMAS IN GAS ENGINEERING (MANUFACTURE) for 1937 to:—

   Eric Frederic Gorman (London), 1*st Class.*
   Samuel Tomlinson Jones (Falkirk), 1*st Class.*
   John Kenneth Mitchell (Brighouse), 1*st Class.*
   George James Rimmer (Hinckley), 1*st Class.*
   Frederick Nelson Tidball (Coventry), 2*nd Class.*

   (*b*) To present DIPLOMAS IN GAS ENGINEERING (SUPPLY) for 1937 to:—

   Frederick Bell (Liverpool), 1*st Class.*
   Bernard George Henry Joseph Hawkings (Plymouth), 2*nd Class.*
   George Garnet Warne (Portsmouth), 2*nd Class.*

10.50 a.m.

4. To report that the alterations to the By-Laws of the Institution were allowed by the Privy Council on 19th July, 1937.

10.55 a.m.

5. Presentation to the former Secretary, Mr. J. R. W. Alexander, M.A., LL.B., F.C.I.S., F.I.Arb.

11 a.m.

6. To receive and discuss the 40th REPORT OF THE JOINT RESEARCH COMMITTEE OF THE INSTITUTION AND LEEDS UNIVERSITY. Combustion Characteristics of Town Gas —Part I. Review of Literature. Part II. Examination of Aeration Test Burner. (*Communication No.* 166.)

11.45 a.m. to 12.30 p.m.

7. To receive and discuss the 41st REPORT OF THE JOINT RESEARCH COMMITTEE OF THE INSTITUTION AND LEEDS UNIVERSITY. The Investigation of the Use of Oxygen and High Pressure in Gasification—Part II. Synthesis of Gaseous Hydrocarbons at High Pressure. (*Communication No.* 167.)

3 to 4.30 p.m.

8. To receive and discuss PAPERS on REMOVAL OF SULPHUR COMPOUNDS FROM GAS, by

   (i) H. Hollings, M.Sc., M.Inst.Gas E.
   (ii) W. K. Hutchison, B.A.
   (iii) R. H. Griffith, D.Phil.

   The Gas Light and Coke Company. (*Communication No.* 175.)

Wednesday, Nov. 3, 1937.

10 a.m.

9. To receive and discuss the 1st REPORT OF THE PIPES COMMITTEE. (*Communication No.* 170.)

10.30 a.m.

10. To receive and discuss the 4th REPORT OF THE GASHOLDER COMMITTEE. (*Communication No.* 171.)

10.55 a.m.

11. To receive a PAPER on THE LOW-TEMPERATURE CARBONIZATION OF SCOTTISH CANNEL, by J. G. King, Ph.D., B.Sc., F.I.C., Chief Chemist, Fuel Research Station, Department of Scientific and Industrial Research, and James Jamieson, M.Inst.Gas E., Engineer and Manager, City of Edinburgh Gas Department (*Publication No.* 162.)

11 a.m.

12. To receive and discuss a PAPER on PURGING GASHOLDERS BY MEANS OF INERT GAS, by F. M. Birks, O.B.E., M.Inst.Gas E., Deputy Chief Engineer, The Gas Light and Coke Company. (*Communication No.* 172.)

11.30 a.m.

13. To receive and discuss a PAPER on RETORT HOUSE AND EXHAUSTER GOVERNING ON GAS WORKS, by G. Dougill, M.Sc., Assoc.M.Inst.Gas E., The Gas Light and Coke Company. (*Communication No.* 173.)

12 noon to 12.30 p.m.

14. To receive and discuss a PAPER on IGNITION OF GAS BY COLD CATALYST, by L. W. Andrew, B.A., B.Sc., A. B. Densham, M.A., and E. W. Voice, Watson House, The Gas Light and Coke Company. (*Communication No.* 174.)

2.15 p.m.

15. To receive and discuss the 7th REPORT OF THE LIQUOR EFFLUENTS AND AMMONIA COMMITTEE. (*Communication No.* 168.)

3 p.m.

16. To receive and discuss the 28th REPORT OF THE REFRACTORY MATERIALS JOINT COMMITTEE. (*Communication No.* 169.)

3.30 p.m.

17. (*a*) To receive the 3rd REPORT OF THE RESEARCH EXECUTIVE COMMITTEE; 1936-37. (*Communication No.* 165.)

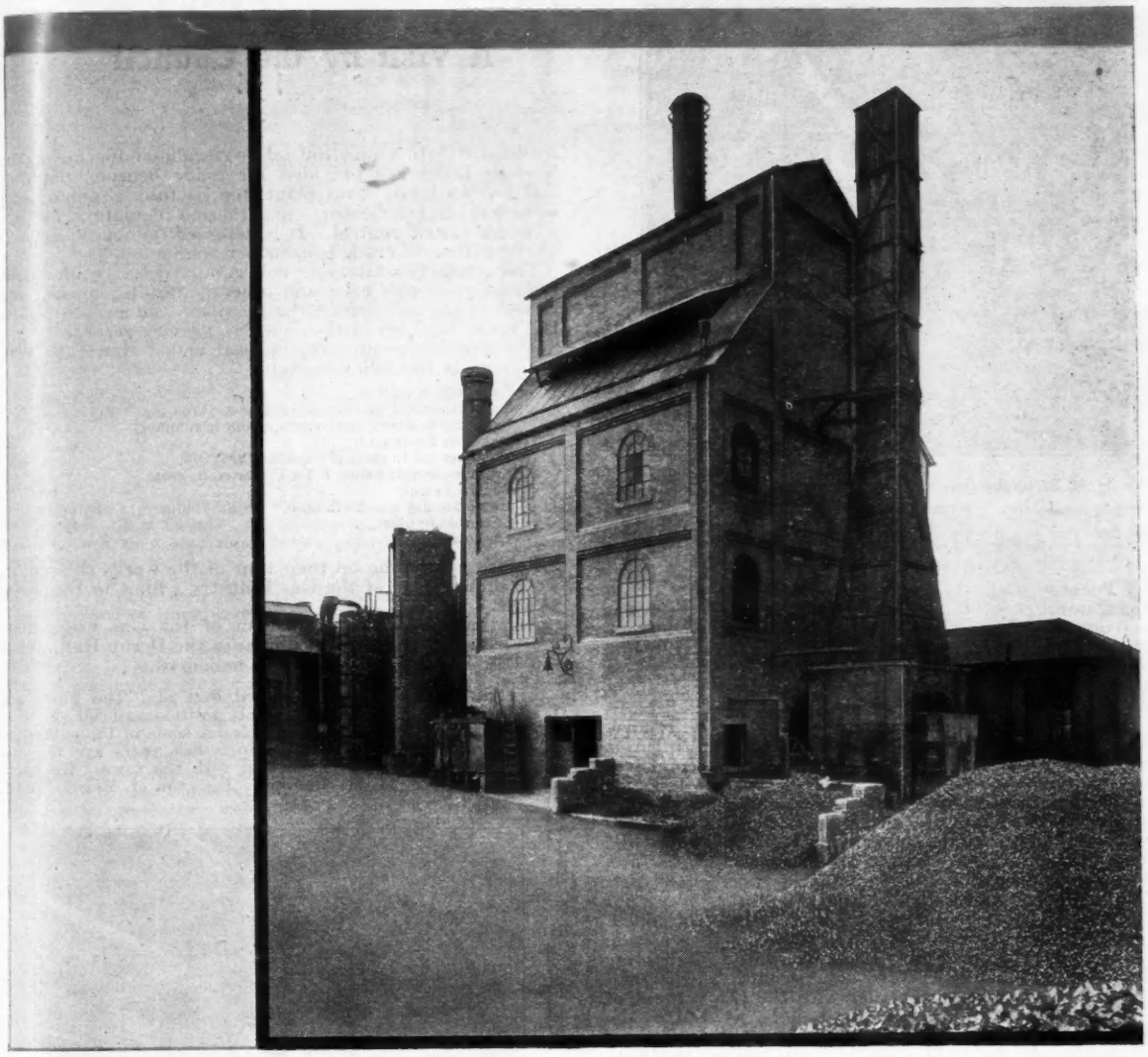
    (*b*) GENERAL DISCUSSION on (i) the 3rd Report of the Research Executive Committee; 1936-37 (*Communication No.* 165) and (ii) Gas Research and Investigation.

    This discussion is intended (*a*) for the consideration of matters referred to in the 3rd Report of the Research Executive Committee and not dealt with in the separately published Communications for which time for discussion has previously been provided during the Meeting, and (*b*) for the review and general discussion of, and the submission and consideration of proposals for, Gas Research and Investigation and Technical Work.

4.15 to 4.30 p.m.

18. To receive a Report of the BALLOT for the election of an Honorary Member and Members, Associate Members and Associates.
19. To report that the 75th ANNUAL GENERAL MEETING will be held in London on 31st May and 1st, 2nd and 3rd June, 1938.
20. To report that the 10th AUTUMN RESEARCH MEETING will be held in London on 1st and 2nd November, 1938.
21. VOTES OF THANKS.

RECENT W-D CARBONISING PLANTS



EPPING

Non-recuperative intermittent vertical chambers

—are installed in this house, eight 1½ ton W-D chambers being arranged in two settings of four. The plant has a capacity of 25 tons of coal per day and is provided with a separate battery of two interconnected producers and a W-D natural draught waste heat boiler, which has been arranged for supplementary producer gas firing.

THE WOODALL-DUCKHAM VERTICAL RETORT & OVEN CONSTRUCTION CO. (1920) LTD.
EBURY AND ALLINGTON HOUSES, 136-150 VICTORIA STREET, LONDON, S.W.1
Members of the Society of British Gas Industries
Telegrams: "Retortical, Sowest, London." Telephone: Victoria 8631 (6 lines)

T.G.S.

Bury Corporation Gas-Works

A Visit by the Council

Mr. H. H. Battersby (Engineer and Manager) takes his guests on a tour of inspection.

On Tuesday, Oct. 19, the Mayor and Corporation of the ancient Borough of Bury, Lancashire, paid a visit to its Gas-Works to take note of the recent work of modernization which has been carried out by the Engineer and Manager, Mr. W. H. Battersby, during the last two years. Gas is made in an installation of Glover-West continuous vertical retorts with a daily capacity of 2½ million cu.ft. per day. The improvements here consist in the renovation of the coke-handling plant, including the substitution of a belt conveyor and elevator for a drag link conveyor, with a consequent reduction of breakage, the installation of a waste-heat recovery plant comprising Spencer-Bonecourt induced-draught firetube boilers in duplicate, each capable of evaporating 15,000 gallons of water per day and raising steam at 380-400° F. and 120 lb. per sq.in. pressure, and the isolation of one retort for coal testing purposes.

An existing coal elevator feeding the storing plant has also been completely renewed, and the drive electrified. The waste-heat boiler installation is equipped with a complete set of instruments for scientific control, indicating and recording the temperature and pressure at the inlet and outlet of the boilers together with the CO_2 content of the waste gases as they enter the boilers, as well as the temperature and quantity of steam generated. All these instruments are mounted upon a panel placed centrally on the boiler platform. Installed primarily for demonstration purposes but also useful as a stand-by is a Bonecourt town gas-fired boiler with complete automatic control placed in an adjoining boiler house and connected up to the works steam range.

For supplying water to the works boilers and other purposes a borehole has been sunk to a depth of 200 ft., 10 in. in diameter and equipped with an electrically-driven pump capable of deliverng 2,000 gallons per hour. The water is treated in a Kennicott water-softening plant. The power plant for the generation of the electricity increasingly used on the works comprises a 60 kW generator direct coupled to an Ashworth & Parker high speed vertical engine with the usual switchboard and control apparatus. In the same house there is an 8 kW generator belt-driven by a National gas engine and a 16 kW motor-driven generator for stand-by uses only.

The interesting innovation in the retort house has been the isolation of one of the vertical retorts as a separate research plant. This has been fitted with a separate coal feed with an Avery automatic coal weigher and connected to a complete new set of ancillary plant installed by Messrs. W. C. Holmes & Co., Ltd., of Huddersfield, thus enabling a comparatively small quantity of coal to be tested under actual working conditions.

Benzole Recovery.

Another important addition to the works equipment is a benzole recovery plant, also by Messrs. W. C. Holmes. The purified gas is passed through a static brush washer in intimate contact with oil which absorbs a portion of the benzole in the gas. The benzole is recovered by subsequent distillation and the oil re-circulated for use again. Storage tanks are provided for crude benzole, naphtha, and the wash-oil. This plant, too, is fully equipped with recorders and indicators and thermo-regulators for efficient automatic control. It is designed for a production of 50,000 gallons of crude benzole per annum.

The works laboratory is well equipped for regular daily tests of gas, coal, coke and other materials, and calorific recorders are installed on the gas made and gas sent out to the town, together with a specific gravity recorder.

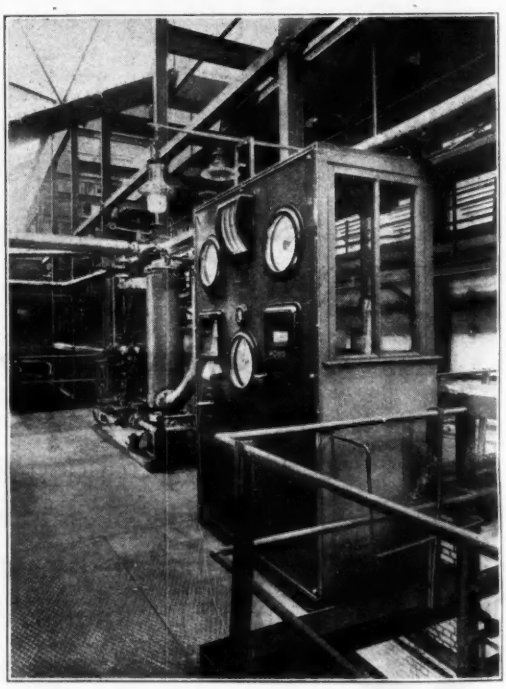
The working results for the year ended March 31, 1937, are given in the following table:

Gas made in cu.ft.	479,234,000
Coal carbonized in tons (approximately 100 tons per day in winter and 70 tons per day in summer)	26,517
Make per ton in cu.ft.	18,072
Make per ton in therms	84·59
Average calorific value, B.Th.U. per cu.ft. gross	468·1
Declared value	465
Maximum day's make in cu.ft.	1,760,000
Coke sold in tons	9,616
Tar sold in tons	2,374

Before proceeding on their tour of the works the visitors were shown some of the Gas Industry's films in the works garage.

Alderman BRADLEY, Chairman of the Gas Committee, presided at the subsequent dinner in the Derby Hall. After the Loyal Toast had been duly honoured,

Sir FREDERICK J. WEST proposed that of "The Town and Trade of Bury." He referred to his position as head of one of the firms which had been responsible for some of the extensions to the Corporation Gas-Works. Forty-five years ago the firm commenced its business association with the town. He hoped that he and Mr. D. M. Henshaw, Director of Messrs. W. C. Holmes & Co., Ltd., of Huddersfield, who was also present, had made some contribution to the Gas Undertaking that had been reflected in the prosperity of the town and trade of Bury. Town and trade were inseparable. By the town he meant the local government. After twenty-nine years' experience of town council work in Manchester he submitted that the activities of the Council and the trade were bound together. The town's public



Control Panel for Waste-Heat Recovery Plant.

services had to progress parallel with the trade of the town. He was not talking from the employers' point of view, but from the point of view of everybody in any town comparable with Bury.

He always felt there were several points in common between Bury and Manchester. The River Irwell contributed very mate-

Benzole Recovery Plant.

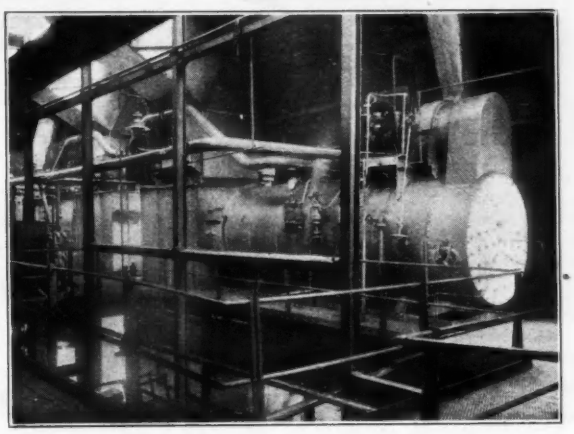
rially to what people termed "his ditch in Manchester"—the Manchester Ship Canal. They distributed the goods which arrived, and they also took Bury's exports and sent them to all parts of the world.

The MAYOR, responding to the toast, spoke of the admirable situation of Bury with its rivers, roads, and low rates. The Town Council of Bury were large employers of labour. Seventeen hundred people were permanently employed, and that figure was at times increased. There was £291,600 in salaries and wages; large figures for a town the size of Bury. The Town Council had built 2,250 houses, and that had been the means of finding a great deal of employment.

Mr. A. L. HOLTON, Chief Engineer of the City of Manchester Gas Department, said the visit to the Bury Gas-Works had proved the foresight of the Gas Committee and officials in bringing the works up-to-date. Those of them who were engaged in the Gas Industry could have nothing but congratulation for the work they were doing in Bury. Their gas undertaking was a credit to themselves and to their officials. He wanted them to understand that the failure or success of a gas undertaking was reflected on similar undertakings in surrounding districts. He wished to urge on all those engaged in the gas undertaking the essential duty which devolved on them of making their undertaking one of the best. He spoke in appreciative terms of the part Alderman Bradley and Alderman Eastham, as Chairman and Vice-Chairman of the Gas Committee, were playing in furthering the progress of the Industry.

Alderman BRADLEY said he felt proud, as Chairman of the Gas Committee, to preside. He said that as a works they were now developing their own water and electricity supply, which was a matter of no small consideration should a time of national emergency arise. Their Gas Engineer, Mr. W. H. Battersby, had given much time and thought to all details connected with the plan of scientific reorganization, which he placed before the Committee some time ago. He thought the present members of the Committee would agree when he said that, though the Gas-Works was the oldest of their municipal trading concerns, they had no intentions whatever of allowing it to become antiquated in the methods of producing its commodities. Like all other businesses, the Gas Industry must be for ever going forward, and it was only by scientific research and technical improvements both in machinery and plant, and in consumers' appliances, that the Industry could hope to retain its position as a supplier of one of the necessities of their every-day life. The Gas Department had in past years contributed no less than £152,903 towards the relief of the rates, and, apart from this, it was in itself one of the largest ratepayers to the town, having paid last year no less than £6,761.

"Our Gas Engineer, Mr. Battersby, has very energetically and with enthusiasm carried out his plan of modernization, and was very anxious to have this visit of inspection by the Council.



Waste-Heat Boiler Installation.

I should just like to express my appreciation to him, the engineering staff, and workmen for the efficient manner in which they carry out their work, at times under difficult circumstances."

Alderman LORD, proposing the toast of "The Visitors," spoke of the assistance the Gas Industry had received from Sir Frederick West, Mr. Holton, Mr. D. M. Henshaw, and Mr. F. O. L. Chorlton.

Mr. D. M. HENSHAW and Mr. F. O. L. CHORLTON, a Director of Messrs. Ashworth & Parker, Ltd., Bury, responded for the visitors.

Amalgamation and Grouping

Gas Consolidation and Stone.

The Directors of Gas Consolidation, Ltd., announce that their recent offer to the shareholders of the Stone Gas Light and Coke Company, Ltd., has been accepted by the holders of a substantial majority of the ordinary share capital of that Company. The offer, which was for all the issued ordinary and preference shares of the Stone Company, provided for the issue of Gas Consolidation shares and cash payments. The offer was conditional on acceptance by the holders of at least 75% of the ordinary shares.

The Cambrian Gas Corporation.

A public issue is expected shortly in connection with a new gas grid in North Wales. The Cambrian Gas Corporation, which was recently registered with a nominal capital of £200,000, is to purchase, with the aid of backing from certain banks, shares in existing gas undertakings in Wales. Some initial finance will be raised by the issue of 100,000 5% cumulative preference shares of £1 each at 21s. 6d. and 60,000 ordinary shares of £1 at 23s. per share. The new grid will bring the constituent companies under unified control and it is expected that considerable economies will be realized. Initial purchases are on a modest scale, but, when the preliminary schemes are completed, it is proposed to develop the grid on a large scale. New purchases will be financed at first by bank loans and, subsequently, by the issue of debentures.

The Chairman and Managing Director of the Cambrian Gas Corporation is Mr. Samuel Moore, Managing Director of the Conway Gas Company, which was formed to acquire the Undertaking of the Conway Corporation following its purchase by Stellite, Ltd.

Exeter's New Parish Church

Floodlighted by Gas

The new parish church of St. Mark's, Exeter, was consecrated by the Bishop of Exeter on Oct. 9, and was floodlighted by gas from Oct. 7 to 16.

The church, which was first conceived in 1919—since when the sum of £25,000 has been raised to build it—is constructed of brick, with Bath facing stones, and will seat 500 persons. It is the first parish church to be built in Exeter for forty years.

The floodlighting was effected by means of forty-two 12-light strip lamps and three 10-light parabolic reflector units, the supply being by means of 2-in. and 1½-in. flexible metallic tubing, with screwed union connections, taken from the 4-in. service which has been laid to provide the gas central heating of the church. The whole of the north side, the east and west ends, and the tower were floodlighted, and the results obtained were greatly admired.

GAS NEVER LETS THE CUSTOMER DOWN

AN "ALDA" OXY-ACETYLENE OUTFIT NEVER LETS *YOU* DOWN

It is a great tradition of the Gas Supply Companies that "Gas never lets the public down." This ideal means organisation, efficiency and rigid maintenance. In maintenance and construction work Oxy-Acetylene equipment is an essential link in the production chain. To help you towards your merited efficiency, the British Oxygen Company Ltd. produces equipment of the highest standard. We commend to your notice the Type "B" outfit as illustrated above. This is the most suitable outfit for all general welding operations on metal from 1/32" to 1" or more in thickness, and consists of Type "B" blowpipe with two shanks, nine nozzles complete in metal box, Oxygen Pressure Regulator, Acetylene Pressure Regulator, Tubing, Keys, and a set of Alda Goggles - **Price complete £11 9s 6d.**

The BRITISH OXYGEN Co LTD

THAMES HOUSE, MILLBANK, WESTMINSTER, LONDON, S.W.1.

1370/W

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Presidential Address

OF

R. N. LeFEVRE, M.Inst.Gas E.,

Officer in Charge of Training, The Gas Light and Coke Company, Watson House.

Presented at the Opening Meeting of the Association held at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C. 1, on Tuesday, Oct. 19.

THE PRESIDENT.

Mr. R. N. LeFevre joined the Brentford Gas Company in 1920 and entered the service of the Gas Light and Coke Company when the former undertaking was absorbed in 1926. Shortly after its inception he joined the staff of Watson House, and subsequently became Officer in Charge of Training. In 1930 he was appointed part-time Assistant Head of the Department of Gas Engineering at the Westminster Technical Institute. He is well known as the co-author of "Domestic Utilization of Gas" and the author of many other works and articles on utilization practice. He presented a Paper on "Consumer Service" at the June Meeting of The Institution of Gas Engineers.

First let me say how very grateful I am to you, my fellow members, for electing me your President for the year which begins with this meeting. I sincerely appreciate the honour you have done me, and I assure you that I will do my utmost to ensure that the Association's year shall be as successful as my predecessors have made the years that have passed. It is particularly gratifying to me that I should commence my year of office as President of this Association in the same year as that in which my chief, Mr. Stephen Lacey, terminated his year of office as President of our parent body, The Institution of Gas Engineers. It is also a great pleasure to me to record that my colleague, Mr. C. I. Winstone—one of our oldest and most enthusiastic members—was recently elected President of the Association of Public Lighting Engineers.

The present year has proved to be an outstanding one as far as the Gas Industry is concerned. Commencing with the opening of Gas Industry House, which, as the President of the Institution said, "stands as striking evidence of the Gas Industry's solidarity and unity of purpose," we pass to more recent events of particular interest to members of this Association. First among these is the amendment to the by-laws of The Institution of Gas Engineers which recently received assent. Next comes the revised Education Scheme of the Institution, which embodies some important changes of particular interest to our members who are still students. Finally, we have the publication of long-needed regulations governing the installation of gas equipment.

Education Scheme.

The revised Education Scheme of The Institution of Gas Engineers will be welcomed by all members of this Association, and in particular by those engaged in technical work on the distribution and utilization sides of the Industry's activities. The term "Gas Engineering" is now to be applied, quite properly, to the whole of gas technology, and the words "Manufacture" or "Supply" added in parentheses to denote the particular branch. Gas Engineering (Supply) is now a course of study comparable with Gas Engineering (Manufacture), and a Higher Grade Certificate in either, together with the necessary qualifications of age, experience, and employment, will admit to Corporate Membership of the Institution. This is only one example of the general recognition as Gas Engineers of those trained or engaged in the Industry on work other than the production of gas.

It is realized, however, that there will remain a proportion of those on the utilization side whose work is of only a semi-technical nature, and who, although they will require a knowledge of gas supply in advance of that provided by the Ordinary Grade Course, will not wish to take the full Gas Engineering (Supply) Higher Grade Examination, and who, even if they did, would not be qualified for admission to the Institution as Corporate Members. For such there is still to remain the existing Higher Grade Certificate in Gas Supply.

Provision has been made for the conversion of a Higher Grade Certificate in Gas Supply to a Higher Grade Certificate in Gas Engineering (Supply). To do this a student must qualify in two additional ancillary subjects—*e.g.*, mathematics and mechanics—each of S.3 standard. In addition he must be employed definitely on the technical side of the Industry's work, whereas this requirement has been removed in respect of the granting of Higher Grade Gas Supply certificates.

In presenting a presidential address it is customary for the author to select a subject descriptive of, or intimately concerning, his particular work in the Industry. Unfortunately for myself at this juncture, I have already this year dealt in some detail with my work in Papers to The Institution of Gas Engineers and to the International Gas Union.[1] I am, however, in touch with some problems of a more general nature which I trust may be of interest to you. I propose, therefore, to say a few words about personnel selection. This subject for convenience may be considered under two headings:

(1) An attempt to predict by means of preliminary tests an individual's suitability for, and probable development in, a given capacity.
(2) Assessment by examination of the development of an individual.

Personnel selection in the end is nothing but examination, for, after all, what are examinations but methods of selecting one or more persons from a number as being more suitable for a particular purpose or award?

Personnel Selection.

The technique of the initial, or predictive, side of personnel selection lies in devising a series of tests which, subject to careful development and standardization, will be as true as possible a measurement of a person's suitability for a given kind of work. For the moment I have deliberately used the word "tests" in preference to "examinations" owing to the stigma attaching to the latter word. Only recently the Technical Press[2] observed: "From our talks with those who are charged with the task of moulding the young mind, we gather that there is considerable doubt in the educational world as to the real value of examinations, and we read that headmasters of secondary schools and the like are also worried about this examination business. For our part, we are with those who view examinations with distrust, so far as they pretend to put a value on the candidate's knowledge, *though we regret that we have no alternative* to offer." The italics are mine, for, as I will show later, there IS no alternative to offer, except to ensure that examinations are what they set out to be and are so foolproof that the examiner as well as the candidate has a clearly defined task. The trouble, where such occurs, is not with examinations, but with the examiners who set them. The writer of the above paragraph refers to examinations in connection with the assessment of a candidate's knowledge, but, as I hope to show you, this, in the preliminary or purely predictive personnel selection tests, which we are

[1] LeFevre, Consumer Service, Inst. Gas Engineers, 1937.
LeFevre, Technical Service for Gas Consumers, International Gas Congress, Paris, 1937.

[2] *Gas Times*, Vol. XII., Fol. 137, Aug. 14, 1937.

considering here, is frequently the least important thing we want to know. May I explain this point by means of an absurd example? You have just elected me as your President. But let us suppose you had to *select* me as your President from among a large number of candidates. How would you do it? What are the qualifications necessary? What tests could you apply to make absolutely certain you selected the most suitable of the candidates? Without seeing them, an examination of academic knowledge might prove useless because the candidate with the highest score might be dumb and thus unable to propose votes of thanks at your meetings. A very simple way would be to employ an accurate measuring device and select the tallest man; this would give a scientifically precise determination of a definite factor, but again it would not necessarily produce the type of man you require.

The obvious method is first to make a complete study of the work the selected man will be required to do and to specify the fundamental abilities you find are necessary to enable him to carry out such work. Call them what you will—examinations or tests—they must be so designed that they will give as true as possible an index of each candidate's suitability.

The problems associated with the science of personnel selection have for many years been the subject of diligent research among interested bodies, both in this country and abroad, and many ingenious tests have been devised. In recent years my Company has paid considerable attention to the subject in the course of a special investigation, and I am convinced that a high value can be placed on the work which is now being done on both the technical and administrative sides of our organization. It must not be imagined that one can sit down and devise a series of tests for a particular group of personnel to be selected, in the same manner as one could sit down and draft an examination paper in Gas Engineering, Geography, German, or any subject demanding knowledge of a specific kind. Personnel selection tests can only be arrived at after considerable experiment; and one of the principal factors in arriving at a satisfactory conclusion is the number of persons tested and the correlation of the results obtained. The greater the number the more reliable the information and, as far as numbers are concerned, we are, of course, in a particularly favourable position.

As I have said, the first problem in the development of a series of tests of this kind is to arrive at the fundamental characteristics of the work to be done by the personnel to be employed. The characteristics of the work demand complementary abilities in the personnel and having devised suitable tests for revealing these abilities it is next necessary to decide upon a method of grading each individual according to the standards arrived at for each test. If we were confronted with twelve inorganic substances and we were asked to tabulate them in order of density the problem would be quite easy. If, however, we had to place them in order of density, hardness, melting point, and price per pound the problem would be complicated by the fact that the classifications under each heading would not necessarily coincide. It would thus be necessary to evaluate each of the four requisite properties. It might be that a high melting point is an absolute necessity, but that the price per pound, although a desirable consideration, is not of major importance. By putting a relative value to each of the four properties we could eventually place each of the twelve substances in the order in which we required them, although someone requiring them for another purpose might disagree with us entirely. Nevertheless, if our tests have been accurately carried out nothing could alter the readings for each particular test made at the time.

A good deal of criticism of personnel selection tests is offered from some quarters; it being argued that it is not possible to label human material in the same manner as I have suggested one might classify a group of substances. It is asked, "What right has one person to attempt to define another person's intelligence?" The answer is that as with all other branches of science accurate measurement is the only sound basis for any kind of comparison or conclusion, and although we have not yet by any means arrived at perfection of measurement in personnel selection the results obtained have amply justified the effort which has been, and is being, made.

I am quite aware that with individuals there are other important factors to be taken into account—age, health, environment, and the several qualities which we understand by the general term "character," and proper regard must be, and as far as lies within our ability is, paid to them.

Suppose that boys be required for training as apprentices to become gasfitters. Their training is to extend over a long period of time and is to entail considerable expense. It is obviously desirable that only those lads who merit such training and will profit by it should be given it. Far from doing the boys an unkindness we are in fact doing them a service in that there is reasonable assurance that they will be taking up work for which they are suited and which they will not abandon and so waste a very valuable portion of their lives.

The elimination process can be narrowed down, and a good deal of trouble saved, by inviting application from those who already fall into some of our requisite classifications. We can insist on their being in a certain age group; educated at a certain type of school; being of a requisite standard of physical fitness, &c. The applicants are thus comparable in many desirable respects. What further tests should we apply? It would obviously be unfair to select only those who could name the capital of Santiago, because many may not have heard of it—and in any case it is a catch. What we do want, however, are lads who first and foremost have sound mechanical aptitude together with manual dexterity, and a fair degree of intelligence because a gasfitter works "on location" without supervision and has to think for himself and frequently make relatively important decisions concerning the best method of doing his work.

It is an established fact, however, that an individual can be too intelligent to constitute a really satisfactory selection for a particular type of work; unless, of course, a sufficiently rapid rate of progress exists or can be anticipated. Give two lads a similar routine task and the more intelligent lad may well make the greater number of mistakes. His mind is not on the job; it does not possess sufficient interest to hold his attention. He may be given a routine job either in the office or the factory which will cause him to lose heart rapidly. He is, to use a hackneyed phrase, a square peg in a round hole and it becomes apparent to the trained observer; while it remains an inexplicable mystery to those of his superiors who fail to appreciate the reason for the lad's lack of enthusiasm. This may show itself in several ways. He may begin to arrive late in the morning, or perhaps even to "answer back"—he, the boy whose headmaster certified as the model of good behaviour and punctuality. Equal, if not greater, misery can be caused by the reverse situation—the lad of low intelligence who finds himself in a job where he has to think for himself and, of course, always does the wrong thing although he is really quite a good lad and would break the piece-rate record if employed on stamping out radio parts. Fortunately for this modern world all types are available, but it is of the utmost desirability to endeavour to place each in the job for which he is naturally best suited.

It was recently remarked:[3]

> "The inefficient clerk who is instructed by his irritated employer to "sharpen his wits" is having an exceedingly heavy demand made upon him, if by the sharpening of wits the employer means the development of intelligence. In most cases it just can't be done. . . . A man's attainments sometimes provided evidence of his struggle to compensate for his occupational unfitness. Many people not fitted for their occupations seek compensation by developing some interesting activity outside their work—it might be horse racing, football, gardening, physical culture, the cinema, or revolutionary politics. Some of them carried their compensating interests to a very satisfactory level by becoming real experts in them."

The much maligned man who has few, if any, hobbies and "just lives for his work" may be far happier—though often less interesting—than those of his contemporaries to whom work is a necessary evil and who, in consequence, live only for their leisure hours. But it has to be recognized that the newcomer to a vocation may have to endure a preliminary period during which he is engaged on work of a standard far below his actual or potential capabilities and that, during such a period, a hobby or other outside interest may well be a very valuable compensating factor.

Returning to the example provided by our apprentice, in devising our tests we must not overlook the fact that although we may find him to possess the desirable standards which we have arrived at for manual dexterity and intelligence, we have still to train him: and our task will be made all the more easy if he already possesses a certain amount of knowledge as distinct from certain inherent abilities. He could be highly intelligent and yet, if he had not been taught, have no knowledge of a specific subject. This, by the way, is one reason why in intelligence tests no question is asked which is likely to be beyond a candidate's standard of knowledge. A pathologist who was ignorant of the British Standard Specification for Soft Solders might be no less intelligent than a Malayan who was unable to recite the present conditional conjugation of *avoir*. But assuming the applicant for

[3] Rodger. Address to Psychology Section, British Association, 1937.

apprenticeship to have given evidence of intelligence up to the standard we have laid down, and presuming him to be of our required degree of general education, we are entitled to assure ourselves that he has acquired an amount of knowledge sufficient to enable him to understand the further training he will be given. He must, for example, possess a reasonable knowledge of, and degree of skill in, arithmetic. Without this his continued education would be impossible. Many highly intelligent boys who also exhibit a high degree of manipulative skill, through no fault of their own, but possibly due to indifferent teaching or lack of practice, cannot carry out even the simple basic arithmetical processes with accuracy.

Because—for this particular type of employee—a certain knowledge and prowess in arithmetic is necessary it does not follow that knowledge in other subjects is essential. General knowledge may be a highly desirable secondary attribute, but it must be severely guarded against in the development of personnel selection tests in which, as I have already stressed, knowledge is often of secondary importance and then needs to be a knowledge only of those subjects necessary to the particular vocation.

According to the circumstances personnel selection tests may include physical tests, but should invariably include an intelligence test. This latter test is equally as important when the vocation demands a low standard of intelligence as it is when a very high standard is required.

Broadly speaking, then, personnel selection tests should give an accurate measurement of:

Intelligence.
Natural aptitude for the particular vocation.
Knowledge, up to the initial standard recognized as necessary for the work.

I am compelled to refrain from giving you any details of the various tests which we are now using. A great deal of work has been done in arriving at suitable tests. The work is still in progress and much remains to be done.

Personnel selection does not end to-day with the selection of persons for vocational employment; it extends even into this room, for you cannot become a member of this Association without possessing certain qualifications and, above all, passing an examination.

Examinations.

I estimate that the boy who follows the normal procedure of preparatory school, via secondary, university, or specialized education to a professional career sits for and must pass at least 300 examinations during his years of study between the ages of five and twenty-one. I am including end-of-term examinations at school, but I have ignored the abundance of interim progress tests.

No element in the structure of our national education occupies at the present time more public attention than our system of examinations. It guards the gates that lead from elementary to secondary education, from secondary education to the Universities, the professions, and many business careers. Quite apart from the safeguards imposed by Acts of Parliament and Government authorities, a whole congeries of examinations has sprung up in the last century, created by private and public bodies of which latter it is reported that between 150 and 200 are responsible for their own schemes of examination.[4]

Examinations are not a modern invention. Many term them an invention of the Devil, and it may be that that is true, since one of the earliest references to an examiner occurs in the book of Job, where Satan is mentioned in this capacity. A report of an examination at Oxford in 1766 infers that the granting of a degree depended upon answering two straightforward viva voce questions, although the writer of the account infers that the accuracy of the answers was not of major importance!

It is quite evident that since examinations have been in existence they have been subjected to criticism, but in more recent years the criticism has become more widespread on account of the increased use of the examination system.

The examinations with which the members of this Association are most directly concerned are, of course, those held in connection with the Education Scheme of The Institution of Gas Engineers. There are, however, many other examinations and tests in which we are either concerned or interested and it must not therefore be assumed that the remarks I am about to make are in any way to be associated with the Institution's examinations.

A short time ago a committee known as the International Institute Examinations Enquiry was set up to investigate on the comparison of marks allotted to examination scripts by independent examiners and boards of examiners. The findings of this committee are truly amazing. Scripts were circulated to examiners, and on their return they were photographed, and then all marks completely removed. This process was repeated many times with the same scripts but with different examiners. Many thousands of scripts were dealt with in this manner, and it was thus possible to compare the findings of a large number of examiners over a wide range of subjects. The range of divergence was extremely wide in some subjects. For example, a particular paper in Essay and Precis Writing was submitted to seven different examiners, who awarded it 28, 32, 46, 56, 56, 58, and 80 out of a maximum of 100 marks. This gives a range of 52 marks.

Now there is surely something wrong with a question which can produce such an answer from one candidate that seven experienced examiners cannot anything like agree as to its merit. If it had been a simple arithmetical paper there could have been only one correct answer to each question, and the examiners could not have failed to be unanimous in their marking of any individual paper.

I have made a close study of examinations, and I am convinced that for the majority of technical subjects it is possible, by avoiding the question which invites the essay type of answer, to design a clear and straightforward examination, free from all ambiguities, which, when attempted, leaves no doubt as to the candidate's ability in the particular subject. In this connection I cannot do better than quote Dr. Ballard, who has done much to improve examinations and publicize scientific methods of examining.

> "The new examiner has arrived, and it is well to look carefully at the sort of examination he sets. The fundamental feature of the new examination is that it is consciously and designedly a measurement. It is a measurement and not a guess. Nor yet an award. The examiner is said to 'give' or 'award' marks, as though marks were a sort of prize or bounty, the value of which depended as much upon the generosity of the giver as upon the merit of the receiver.
>
> "While the old examiner sets a small number of large questions, the new examiner sets a large number of small questions. At a university examination about a dozen questions have to be answered in three hours; at an American Army examination 212 questions have to be answered in less than half an hour. It is clear that the new examiner atomizes his test: discarding the single bullet, he charges his gun with buckshot. The mode of marking . . . is purely objective . . . to get a scale which will give the same score for the same paper whoever the examiner may be. The Americans call it making the examination fool-proof. A fool-proof test is one which prevents the examiner from making a fool of himself. It is generally believed that making a fool of oneself is a practice of the examinee; the examiner is supposed to be free. That is because he is never found out."[5]

It is obviously worth an examiner's trouble to set a paper which will secure certitude in the marking, remove all suspicion of personal bias, and, above all, entirely obviate the possibility of the injustice of a false verdict.

Let us take a typical question of the old school of Gas Supply examiners:

> *Discuss the relative merits of fans and pumps for conveying gas. State the conditions favourable to each.*

I will not criticize the English, although I have yet to see gas being conveyed by a pump. But what a question to call forth ten pages of foolscap from a candidate who has only the vaguest ideas on gas distribution yet possesses a remarkable flair for telling the tale! Both candidate and examiner are given a considerable amount of work for what is, after all, a small detail among a host of important things the candidate ought to know.

One could save much time and effort by asking:

> *Name three types of pump.*

This might, though, produce the opposite effect, since a candidate who wrote "Bicycle, car, and village" could not but be given full marks.

How much better to give a question such as this:

> *The following is a list of methods employed for raising the pressure of gas. Put a cross against the one you consider most suitable for . . ., &c.,*
>
> **or**
>
> *. . . re-write the list and against each state the pressure range for which it is suitable.*

In gasfitting examinations in the past it was customary to ask candidates to describe how they would perform some particular operation, such as, for example, carrying out the maintenance of a gas fire. Such a question will produce all kinds of answer from "*See that it's O.K.*" to "*Dear Sir, I should knock at the door if there was a door*

[4] An Examination of Examinations by Sir Phillip Hartog and Dr. E. C. Rhodes; Macmillan & Co., Ltd., 1936.

[5] The New Examiner, by Dr. P. B. Ballard; Hodder & Stoughton, 1929.

and if the lady came to the door I should say good morning madam I am from the Blanktown Gas Company but if the gentleman came to the door I should say good morning sir please I've come to do the gas fire. I should next . . ., &c., &c., &c.," for about ten pages.

Compare this with the concise clear-cut questions of the modern Gas Fitting Examination[6] which contains questions such as:

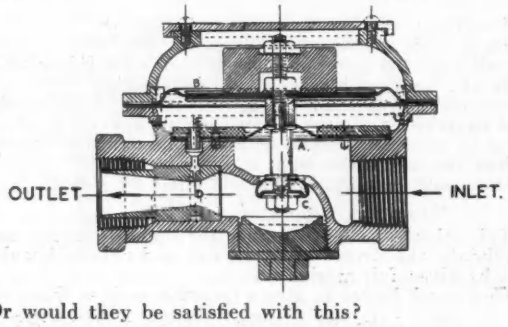
The most important operations in exchanging a large by-passed meter are as follows:
(a) Test for correct registration on full load.
(b) Close inlet valve.
(c) See that all appliances are turned off.
(d) Open inlet valve.
(e) Expel air.
(f) Close outlet valve.
(g) Test for soundness with pressure gauge.
(h) Close by-pass valve.
(i) Test for registration on small load.
(j) Open outlet valve.
(k) Open by-pass valve.
By means of the letters (there is no need to write the words) make a list showing the order in which you would carry out the work.

The answer to this question is no tax on the candidate's literary ability. He has merely to know his job and produce a list of letters. The examiner is tied to a key and scores according to the number of letters misplaced; certain major errors carrying heavy penalties.

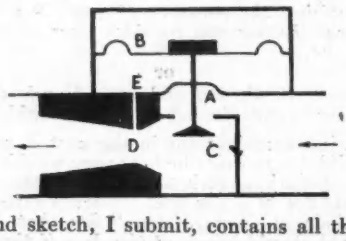
In other questions of a similar nature the candidate is given a variety of answers and is merely required to put a cross in front of the best answer. Or, he may be given a sketch and asked to put a cross against certain features of it. And in order to make certain that there will be no mistake in the scoring the examiner is told exactly where the crosses should appear. This ties the examiner's hands and permits of any number of examiners being employed. In the example in question the scheme does not give the budding author a chance, nor does it distinguish between the literate and the illiterate, but it is not intended to do so; it is not a test of English but of practical gas fitting to see whether the candidate has the specific knowledge to enable him to go about a job of work in an intelligent and safe manner. Moreover, it permits of being only one of a large number of questions which can thus test the candidate over a wide range quickly, without fatigue and with certitude.

The Institution of Gas Engineers Examiners in Gas Supply in their report on the 1937 Higher Grade Examinations say in regard to Group B—Question 4; "Quite well done but many of the sketches were poor." Well, what if they were? Was it an examination in the technique of Gas Supply or a test of freehand sketching? I frequently remark that sketching is the international language of the engineer and I would be the last to advocate any diminution in the standard of draughtsmanship desirable in all technical students. What I am not in agreement with, however, is the suggestion that it is a critical point in a knowledge of the main subject *per se*. What do the examiners require?

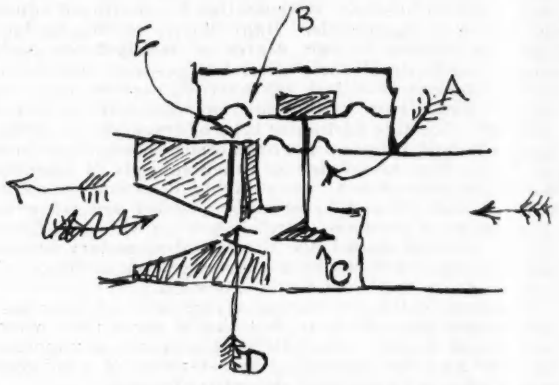
If they want a section of a governor shown, do they hope to see this?



Or would they be satisfied with this?



This second sketch, I submit, contains all that is necessary to convince the examiners that the candidate fully appreciates the construction of the device. Now let us go a stage further and assume that the candidate possesses the same knowledge but is a bit shaky with his pen, although he can produce a good drawing or sketch with the necessary instruments. Suppose his sketch to turn out like this.



Would it be right to criticise his knowledge of Gas Supply? This last sketch is, from the point of view of knowledge of the main subject, quite as useful as the one before in that it clearly indicates that the candidate understands the function and method of operation of the device depicted.

The examiners have said that sketches are poor, but they have made no reference to handwriting. Both are methods of expression and are of equal importance, but, I suggest, provided they are readable, both are of no consequence in assessing a candidate's knowledge of a subject. If handwriting or sketching are necessary attributes, then separate ability tests in these subjects should be given.

The examiners' report goes on to say: "There is a tendency towards lengthy answers. Conciseness, coupled with preciseness, might very well be emphasized by the instructors."

With this I fully agree, but I would suggest that the length of an answer can be regulated precisely by the method of asking the question. Even where the undesirable type of essay answer is unavoidable, it is possible to word the question "In not more than three lines state the advantages of xxx," or, better still, "Make a list of five advantages (each in not more than three words) of xxx." The latter form makes for much easier marking, since the examiner can see at a glance the candidate's observations and mark them quickly and accurately. By far the best method is for the examination paper to be prepared with spaces for the answers adjacent to the questions. If an answer requires only one word or a tick or a cross that is all the candidate has room to put in the appropriate space provided.

In short, examination questions should be set so that no doubt is left in the candidate's mind as to exactly what and how much he has to do, and the method of scoring should be made an accurate process of measurement. If this be done we need have no fear of the reliability of examinations.

There must inevitably remain examinations where the essay type of answer is necessary, but these should be confined to examinations in essay writing and the higher examinations in which the candidate is being tested on his ability to think or to express his views.

In conclusion, I wish to express my thanks to the Governor and Directors of the Gas Light and Coke Company for so willingly granting me permission to accept this office and present this Address. I also gratefully acknowledge the assistance of my colleagues, and in particular Mr. E. W. Hobbs—my Company's Industrial Consultant—whose work on personnel selection has formed the basis of my remarks on this subject.

Discussion.

In the course of a short discussion which followed Mr. LeFevre's Presidential Address, Dr. J. N. Long (Principal of the Westminster Technical Institute) congratulated the Author on becoming President of the Association—which redounded to the credit of the Institute in which they were both engaged. The Address made sad reading for the person who in these days might regard himself as a "professional examiner," though progress was being made by examiners to form their questions in such a way as to get the answers they wanted. Dr. Long observed that boys grew up extremely fast between the ages of 14 and 18, and some kind of re-grading at the age of (say) 18 was worthy of consideration. He also referred to the perseverance factor, which influenced the final point at

[6] City and Guilds of London. Final Grade Examination in Gas Fitting, 1937. Written paper. Question 2.

which a youth finished his studies. He thought the best type of examination question was that which permitted the examinees to use any books of reference they liked; many of their examinations were now arranged in that way. The "tabular" type of question, whereby the examinee ticked or crossed out alternative points, was another method they were adopting with advantage; they were not setting catches or asking riddles; they were trying to discover the students' knowledge.

Mr. W. E. LE B. DIAMOND (Assistant Secretary of The Institution of Gas Engineers) said that they must differentiate between whether the examination was intended to be a test or part of the training course. If it was merely a matter of training the answers would be much better tabulated; but where the scheme of instruction had been definitely on the basis of education—in the sense of deciding whether the boy was or was not going on to a University course—then the answer must be one which would draw out the value of the training which the examinee had received.

Mr. F. C. SMITH (Gas Light and Coke) emphasized that an examination was intended to discover what a candidate knew and not what he did *not* know. For that reason he was personally in favour of a fair selection of questions. But there should be no questions likely to embarrass the student, while there should be alternative questions to draw out his knowledge. Many examinees could write all round a subject and get away with it; but the man who had the ability to put down what he wanted to convey in a logical sequence would be given credit for it by an experienced examiner. While short answers had their uses, said Mr. Smith, they could not cover the full range of the examination system. He felt very strongly that their technical institutions should not be entirely taken up with vocational training. It was possible for a man to acquire a good deal of knowledge about his particular job and yet be entirely ignorant of what was going on around him. He was not acquiring sufficient knowledge to make him a useful member of society. If their evening classes were merely devoted to "cramming" people to pass tests they were not doing what they were intended to do. The student's leisure hours should be directed towards making him a useful member of society.

Mr. R. SUMMERSON (Luton) said that the student who had knowledge and intelligence could usually divine what was in the mind of the examiner, and if he was a good man he would get through the examination.

Mr. OFFORD BUXTON (South Metropolitan), in the course of a written contribution to the discussion, remarked that the Presidential Address, excellent as it was in many ways, suggested, in its advocacy of "slick" examinations, a grave departure from the underlying facets of education as such. The ability to formulate an argument and logically to outline a case was as integral a component of the educated student as the actual knowledge of the fundamental data. The logical outcome of the "Yes-or-No" type of examination envisaged by Mr. LeFevre would be a working agreement with the Pelman Institute, honour being accorded the student who had developed his flair for memorizing data to the fullest extent. Psittacosis would be at a premium. The ability to draw a simple self-explanatory diagram was just as important. This "gift"—as some would have them regard it—depended upon a clear-thinking mind and, in the case of some, a little assiduous practice. If, after five years, a student was not able to draw a moderately straight line from A to B, there was something radically wrong either with the educational system or with the student. These factors being so indissolubly bound up with the proper tuition of a student, it was difficult to see how any educational examination could ignore them and still justify its name.

The PRESIDENT, replying to various points raised, remarked that he was not advocating questions of the "Yes" or "No" type where it was merely a matter of guesswork. But questions could be set so as to obtain a concise answer. Questions should be long enough to make their object absolutely clear and give the candidate an idea of what the examiner wanted from him. There were many people in Great Britain to-day not holding the Schools Certificate or Matriculation because they were unlucky in the particular examination for which they sat. If everybody adopted personnel selection, the matter evened itself out in the long run. In the Gas Light and Coke Company at the moment they felt very strongly that when they engaged a boy they should be offering him a career for life and not a blind alley occupation. They gave their boys two years' probational employment, during which time they carried out productive or semi-productive work. If after that period they were found to be satisfactory they were indentured for four years. By that time they were satisfied that they were the right type for the job.

Mr. S. C. WALDOCK (Gas Light and Coke), the Senior Vice-President, in proposing a vote of thanks to the President, congratulated him on his excellent Address. The subject of personnel selection, he observed, was one of great importance, and it was to be hoped that as a result of experiments and investigations to which the President had referred, a satisfactory system of preliminary tests would be evolved which would eventually lead to at least a reduction in the number of misfits. He was particularly pleased to hear the President refer to character as an important factor, and he was reminded that Sir Francis Goodenough put character first when dealing with the subject of qualifications for particular vocations. As regards examinations, Mr. LeFevre spoke with the knowledge of an expert. He had been through all the stages himself—student, examinee, instructor, and examiner—not forgetting his official duties as Officer-in-Charge of Training at Watson House and his activities at the Westminster Technical Institute. He had also given them all the answers in his text books and articles on the theory and practice of Gas Fitting and Supply. He had illustrated the progress made in the whole system of examinations in connection with the subjects which were of particular interest to the Association. Clear-cut and concise questions helped the student to allocate his time to the best advantage so as to cover all the questions he was required to answer within the time limits laid down. The work of the examiner was also, of course, simplified.

The vote of thanks was seconded by Mr. H. W. H. BUTTERFIELD (South Suburban), the Junior Vice-President, supported by Lt.-Col. W. E. FRENCH (Superintendent of the City and Guilds of London Institute), and heartily accorded.

London and Southern Juniors

Opening Meeting

The opening meeting of the new session of the London and Southern District Junior Gas Association was held at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C. 1, on Tuesday, Oct. 19—Mr. R. SUMMERSON, of Luton, the retiring President, occupying the chair at the outset.

The ASSISTANT HON. SECRETARY (Mr. H. J. Risby, South Metropolitan) read the minutes of the last general meeting, which were duly confirmed and signed, after which the President extended a warm welcome to a number of distinguished visitors. Among these were Mr. R. J. Milbourne, Mr. W. E. Le B. Diamond (Assistant Secretary of The Institution of Gas Engineers), Dr. J. N. Long (Principal of the Westminster Technical Institute), and Lt.-Col. W. E. French (Superintendent of the City and Guilds of London Institute).

Mr. SUMMERSON then vacated the Presidential chair in favour of his successor, Mr. R. N. LEFEVRE (Gas Light and Coke Company), to whom he wished a very happy year of office.

The NEW PRESIDENT, on taking the chair, said that his first duty was a very pleasant one—namely, to make a presentation to the retiring President. During the past year, he said, Mr. Summerson had proved himself to be all that they wanted of a President, and he had worked exceedingly hard to promote the prestige and usefulness of the Association. On behalf of all the members he had great pleasure in asking Mr. Summerson to accept the gift of a clock as a small souvenir of his year of office, together with their very best wishes for his future happiness and continued prosperity.

Mr. SUMMERSON, in acknowledging the presentation, said he would always carry with him the memory of an exceedingly happy year as President of the Association. The office was one which it was a privilege and experience to occupy, for which he was truly grateful.

Mr. LEFEVRE thereafter delivered his Presidential Address, which, together with the short discussion which followed it, will be found elsewhere in this issue of the "JOURNAL."

Presentation of the Milbourne Medal.

Mr. R. J. MILBOURNE later presented the Milbourne Medal to Mr. F. O. Hawes, of the Tottenham and District Gas Company, for his Paper, "The Effects of Changes in Composition Upon the Combustion of Town Gas," which was adjudged to be the best Paper presented by a member to the Association during the 1936-37 session. In handing the medal to Mr. Hawes, the donor said that the subject he had chosen was one of considerable importance to the Gas Industry and had involved investigations extending over several years. Mr. Milbourne went on to remark how gratifying it was to know that the work of the Junior Associations was realized and appreciated by the Senior members of the Industry. He was sure they would all enthusiastically endorse the concluding passage in Mr. Hawes' Paper in which he expressed his thanks to the Chief Engineer of the Tottenham and District Gas Company for permitting the results of that research work to be communicated to the Industry through the channels of a Junior Association. It showed striking evidence that the work of the Junior Associations was highly appreciated, and he was sure that the more assistance the Juniors were given—particularly from those in high authority—the greater would be the Industry's advancement. He wished Mr. Hawes all success in his career.

MIDLAND JUNIOR GAS ASSOCIATION.

THE PRESIDENT.

Mr. E. T. Pickering received his early education at King Edward's Grammar School, Birmingham, joining the chemical staff of the Birmingham Gas Department in 1915. Following two years' war service, he continued his studies at the Birmingham University, obtaining the degree of B.Sc.; in 1922 he re-joined the chemical staff of the Gas Department. Mr. Pickering is an Associate of the Institute of Chemistry and a lecturer in gas subjects at the Municipal Technical College.

Presidential Address

OF

E. T. PICKERING, B.Sc., A.I.C.,

Central Laboratory, City of Birmingham Gas Department.

Presented at the Opening Meeting of the Association held at the Gas Offices, Birmingham, on Thursday, Oct. 7.

The Gas Industry, in common with most other sections of British industry, is enjoying a period of relative prosperity, and there is naturally an air of confidence abroad. It would be difficult to estimate the extent to which the present re-armament programme is responsible for the increased volume of trade, but it seems highly probable that when this programme nears completion—peacefully we hope—there will be a serious gap to fill.

The recent general expansion of business is therefore unlikely to continue unchecked, and we shall, along with others, face more difficult times. In the circumstances it is natural to enquire whether our present confidence is justified.

Progress of Recent Years.

Recent years have seen gradual but continuous advances on the manufacturing side. Coal gas is now made with a commercial efficiency as high as 86%, and in this connection it is worthy of note that while the volume of gas produced increased from 178,000 million cu.ft. in 1910 to 295,000 million cu.ft. in 1934, the coal carbonized increased only from 15·1 to 17·1 million tons a year. Had it not been for technological progress made in the intervening period, an additional 7·9 million tons of coal would have been required.

Much attention has been given to the all-important matters of uniformity of calorific value and adequacy of pressure, both highly important in view of the greater sensitivity of gas using apparatus and the close limits within which many industrial heating operations are carried out.

The quality of our solid product, coke, has also been considerably improved. This has been brought about in a variety of ways, according to local conditions—*e.g.*, by the introduction of continuous vertical retorts, by selection and sometimes by mixing or blending of suitable coals, by dry-quenching, and then again by retaining the smaller and inferior material for use on the works, the larger sizes being cut to give a better quality product for sale, particularly in the domestic sizes. In addition, an all-round improvement has been effected in the sizing of coke, for which improvement we are not a little indebted to the manufacturers of the various screening plants now on the market.

The general public is showing an increasing interest in the abolition of smoke. Never before in our history have the benefits of exposure to sunlight and fresh air been appreciated and sought after as they are to-day. Air travel also is helping to create a smoke-conscious generation.

Nevertheless, in spite of the excellent work being done by the Smoke Abatement Society and other bodies, and the greater publicity which this matter is generally receiving, it is doubtful whether the average householder yet realizes that the burning of raw bituminous coal on the domestic hearth is, in the aggregate, the chief source of the evil of visible smoke.

It is, I believe, no exaggeration to say that in most parts of the country it is possible for gas undertakings to supply a solid smokeless fuel which, used in conjunction with the well-known coke burning grate, provides a practical substitute for the use of bituminous coal in the open fireplace, and which brings a labour-saving and healthily heated coke-cum-gas home within the means of the majority of the people.

A very instructive set of figures given by R. W. Hunter and G. W. Anderson* (Table 1) shows the remarkable manner in which the market for gas coke has changed in quite recent years.

TABLE 1.—*Gas Coke Sales (Metric Tons).*

—	Industrial.	Domestic and Others.
1925	4,697,000	1,915,000
1930	3,890,000	3,454,000
1931	3,684,000	3,045,000
1932	3,209,000	3,465,000
1933	2,975,000	3,947,000
1934	2,765,000	4,140,000

While considerable advances have been made on the manufacturing side, we undoubtedly owe much of our recent progress to the remarkable strides made in the perfection of all manner of furnaces, appliances, &c., for the utilization of our products, and to the excellent publicity campaigns, which have never allowed the public to forget that gas is up-to-date and able to render the service required of it at a reasonable cost.

Organization of the Industry.

Apart, however, from the visible progress which has been and continues to be effected on both the manufacturing and sales sides, noteworthy progress is being made in giving the Industry a modern organization and outlook, which should stand us in good stead.

One of the outstanding events of the year has been the opening of Gas Industry House. The building is a very fine one, and its position on the site of the old Wellington Club at Hyde Park Corner is a magnificent one; but its significance to me lies rather in the fact that it is the outward and visible sign of the " get together " spirit which seems to animate all those interests whose well-being depends upon the successful disposal of our products.

One has sometimes suspected the activities of large organizations of being reactionary rather than progressive, but I believe there is no lack of evidence to show this is not so in the case of the Gas Industry's organizations.

A straw in the wind, perhaps, was the fact that the immediate Past-President of The Institution of Gas Engineers, Mr. Stephen Lacey, was the first holder of that high office to be chosen from outside the ranks of the traditional gas engineer. Then again this year members of the Institution have agreed to an amendment of the by-laws by means of which certain technical men hitherto ineligible for membership may now be admitted. For years it has seemed to many of us that the scientific

* Third World Power Conference, Washington, 1936.

workers employed in the Industry have been insufficiently represented in the membership of the parent technical body, and we sincerely welcome the beginning that has been made.

Research.

Another heartening and important feature is the greater appreciation of the value of scientific research which seems to be spreading through the Industry to-day. At the same time we have frequently been reminded, I almost said warned, by those best qualified to judge, that the amount spent on this vital matter is not commensurate with the Industry's size.

In their annual report for 1937 the Society of British Gas Industries state that members of the Society expend just over £160,000 per annum on development work and research. It would appear, however, that the gas undertakings, with one or two notable exceptions, do not make anything like so good a showing.

The rapidity with which organized research is growing in this country is demonstrated by the fact that whereas in 1932-33 a total of £167,370 was provided by the industries concerned for the support of Research Associations* organized by them, in 1935-36 this has grown to £232,468, an increase of 40% in three years.

Looking back on industrial history one can hardly fail to be struck by the part chance has played in many of the most important inventions and discoveries. In the case of our own Industry, Dr. Clayton might well have preceded William Murdoch by some 50 years in recognizing the possible utility of coal gas as an illuminant, while, in his turn, Murdoch would probably have anticipated George Stephenson in his invention of the steam locomotive by a like period, had his experimental work not been discouraged by James Watt.

The discoveries of Bunsen and Welsbach which revolutionized and regenerated our Industry came at a most fortunate time, but I imagine that neither the gas engineers and managers nor, indeed, anyone connected with the Gas Industry of that day would lay claim to any credit on that account.

One could multiply these examples many times, but the point is that to-day, with industrial events moving at almost bewildering speed, we can no longer tolerate a state of affairs in which chance plays so large a part in determining the course of our future development. Not that organized research can with certainty solve any and every problem put before it, but it does greatly facilitate a systematic investigation of any selected field, in the course of which chemical, engineering, physical, and mathematical minds may be brought to bear on the problem in hand —a point of the highest importance in bringing about a sufficiently rapid solution of industrial problems to-day.

As Juniors, relatively few of us are called upon to participate actively in the work of research. Nevertheless, let us remember that the research of to-day gives birth to the processes we shall operate to-morrow. Let us do all we can to maintain touch with the research work appertaining to our own section and keep our minds receptive to the new ideas which will surely be evolved.

Members will perhaps have noted that this session the Association is to visit a centre of research—I refer to the Fuel Research Board's Station at East Greenwich—where, among many other matters of interest to us, investigations are being conducted on the Fischer Tropsch process, while in conjunction with The Institution of Gas Engineers research work is being carried out in connection with the Lurgi oxygen pressure process. We have also been fortunate in securing a lecture from Mr. A. T. Green, Director of Research of the British Refractories Research Association.

Influence of External Events.

While our future prosperity or otherwise depends much upon our own efforts, we cannot fail to be affected in some measure by external events—economic conditions, social conditions, politics, custom, and fashion. In this uncertain world one would rather be excused the task of forecasting the likely trend of events, but it is not possible, with any degree of satisfaction, to emulate the reputed feat of the ostrich. There are perhaps a few aspects on which one may venture an opinion.

Given a period of peace we are hardly likely to be visited with a depression of the magnitude of that experienced a few years ago, and the general improvement in social conditions of the mass of the people, which has proceeded apace since the conclusion of the World War, seems bound to continue. Feminine influence will also continue to extend. These tendencies must inevitably lead to a greater demand for labour-saving services in the home, such as we provide. The falling birthrate leading within a very few years to a stationary and even declining population seems to be an adverse factor, although in many cases it will permit a greater expenditure on items which many folk have perforce to regard as luxuries to-day. Competition on the part of both our direct and indirect competitors is certain to be more severe even than at present—for instance, the coal industry has realized the immense advantages of a modern organized research and marketing policy, which will render the displacement of raw coal by alternative fuels more difficult; while our indirect competitors—the motor-car, the telephone, foreign travel agencies, &c., will all take increasing toll of the "little man's" income. The situation is rendered more complex by the threatened rise in coal prices and rail rates. Increased costs for our raw material will no doubt give a fillip to development work directed towards obtaining a greater yield of enrichers, and processes which have been pigeon-holed may well become profitable propositions.

When we come to consider the effect of political tendencies we are indeed on shifting sands. One of the results of the present tendency for nations to seek after self-sufficiency is that processes which could not otherwise stand on their own feet are artificially encouraged by the use of subsidies, preferential taxation, &c. In this connection we are chiefly concerned, of course, with the production of oil from indigenous materials.

Members will be aware that there are at least three processes technically possible—viz., low-temperature carbonization, high-pressure hydrogenation, and the Fischer-Tropsch process. A Committee appointed by the Government and under the Chairmanship of Lord Falmouth is at present exploring the position, which is obviously of great importance to us. We may, however, point with some pride (although we may not get much credit for it) that the Gas Industry working on normal commercial lines is daily supplying the public with:

(1) Gas—the cheapest labour-saving fuel on tap.
(2) Coke—the cheapest solid smokeless fuel, and usually cheaper than coal itself.
(3) Benzole—one of the finest home-produced motor fuels, and an indispensable primary for many essential organic compounds.
(4) Tar—a home-produced material for the construction of safe, comfortable, and durable roads on which so much capital and attention are being expended to-day.

This is no time for preening our feathers; we are faced with problems too numerous and complex for that, as a perusal of the Papers and discussions at the recent Institution meeting alone will quickly show. Nevertheless, as I read the signs, the Industry has embarked on a National policy for co-ordinated action between all sections and all interests coupled with a progressive spirit which, if resolutely pursued, cannot fail to bring its due reward.

Aspects of the Chemist's Work in the Industry.

Turning now from the general to the particular, I should like to consider one or two aspects of the chemist's work in the Industry.

One of the most noticeable changes of recent years has been the introduction and wide use of Standard Methods. In the case of calorimetry we have, of course, the methods of the Gas Referees which, although they do not exactly come in the category of Standard Methods, are almost universally adopted in this country.

For tar testing there are the methods of the standardization of the Tar Products Tests Committee, while for petroleum and its products the Standard Methods published by the Institution of Petroleum Technologists are available. Then again the British Standards Institution have issued specifications which touch the chemist's work at many points, but more particularly perhaps in the sampling and analysis of coal and coke.

Generally speaking, I am strongly of the opinion that the adoption of Standard Methods leads to better and more useful work. Few, I think, will deny that the standard of calorific value testing is, on the whole, better than it was before the introduction of the Notification of the Gas Referees. Very many of our tests are of a purely arbitrary nature—*e.g.*, the tests for volatile matter, swelling index for coal, or the shatter test for coke—and obviously unless everyone adopts nationally standardized methods it is impossible to be sure that we are comparing like with like. Hardly-won knowledge has in the past lost much of its value on this account.

It is sometimes argued that the standardization of a method may hamper its further development and stifle the development of alternative and possibly better methods. There is undoubtedly some danger in this respect, and much will depend upon the care with which methods are selected for standardization; certainly a method should

* The Research Associations associated with the Department of Industrial and Scientific Research.

not be standardized until it has been reasonably well developed.

It is also argued that the use of standard methods discourages individual initiative, and reduces the operator to an automaton. Looking back to the days before nationally standardized methods came widely into use, it would generally be found that the methods employed in a particular laboratory were, to all intents and purposes, standard for that laboratory. Further, owing to the desire to preserve continuity of testing, methods changed very infrequently, so that in effect the chemist is probably no worse off than before.

It may sometimes happen that standard specifications are placed in the hands of newcomers to Industry, and there may be a tendency blindly to "follow the book," without properly appreciating the why and wherefore of the method employed. Latterly one has noticed some increase in the amount of explanatory matter, but much more could advantageously be done in this direction. It would, I think, be very helpful if along with every standard method there could be included in suitable form some explanation of the reasons for the particular procedure adopted, supported, where necessary, by relevant data. If this proved impossible, a list of references to the literature would often be extremely useful.

I am not unmindful that the demands made on the time and energy of those gentlemen who give their services to the work of standardization are already considerable, but improvement in the suggested manner may not be too dearly bought even at the expense of a reduced output.

It would be foolish to claim that in every case the standard method is the best possible. Rather is it the one on which, taking into consideration the standard of accuracy required, and the limitations of laboratories in which the method is likely to be used, there is the greatest common measure of agreement between the qualified representatives of the various interests concerned.

Evolution of a British Standard Specification.

It is not always realized what a tremendous amount of careful work is entailed in the preparation of a standard method. Members may be interested in a brief outline of the writer's experience concerning the evolution of a British Standard Specification. Acknowledgments are here due to the B.S. Institution for reviewing the following notes:

First phase.—Before the Institution will undertake the preparation of a Specification it has to be satisfied that there is a consensus of opinion favourable to the work being put in hand.

Normally the advisability of undertaking a particular piece of work is decided by the appropriate divisional Council, but if there is any doubt a fully representative conference is called together to discuss the matter.

Second phase.—The actual work of preparation is carried out by the Technical Committees, Sub-Committees, and Panels which are constituted mainly of technical experts representing the various interests concerned.

For the purpose of illustration I have chosen a specification which refers to the determination of the swelling properties of coal, by means of a simple crucible test. In this particular instance the method suggested for standardization was one which had been very successfully utilized for several years in quite a number of laboratories, but before drawing up the specification members of the panel responsible had to assure themselves that not only were results reproducible in individual laboratories, but that a satisfactory degree of concordance would be obtained between different laboratories in different parts of the country.

Before actually proceeding with experimental work, it was deemed advisable to specify more closely certain conditions, particularly those relating to rate of heating—a vital factor in a test of this nature. The method as revised by the Panel had now to be tried out, and for this purpose a representative set of coals was prepared and sent out to each member for test. The results of these tests were regarded as promising, but several members experienced difficulty in obtaining the specified test conditions in their particular localities, and it became necessary to modify the technique to meet such cases. This, of course, necessitated the circulation of another set of samples, this time covering a rather wider range of coals. Even then, however, one or two members had some difficulty in complying with the specified conditions; this led to further alterations and to the circulation of yet a third set of samples.

Third phase.—This time the results were regarded as sufficiently satisfactory to justify proceeding to the next stage—that of circulation for comment of the typewritten draft method to all firms, institutions, &c., likely to be interested, both at home and abroad.

Fourth phase.—On the expiration of the time limit set for replies, the comments sent in (from 18 different sources) were carefully considered, and although no drastic alteration was necessary, quite a number of minor alterations were made, and several explanatory notes added.

At the time of writing the specification to which I refer has only reached this fourth phase.

A normal course of procedure would be as follows:

Fifth phase.—Having modified the method in the light of comments received, the specification is now printed in galley form and presented to the main Technical Committee. Even now there may be some slight modification, but, assuming approval, everything is set for the final act.

Sixth phase.—Publication.

Time does not permit a detailed account of all the points considered and explored by the Panel in the course of preparing this specification, but among them were such matters as the effect of fineness of grinding and of storage of the coal used, the advisability of using an electrical method of heating; weight, dimensions, and tolerances of the silica crucible (finally settled in consultation with the makers); use of different weights of coal, use of various types of draught shield, use of lower temperature, method of viewing button, advisability of expressing results on a volume basis, number of tests to be made to ensure accuracy within given limits, &c.

It might also be mentioned that in the early stages of the work consideration was given to the possibility of using other recognized methods for the swelling properties of coal, and a large number of tests were made by such methods on the coals circulated.

I ought to mention that following usual British Standards Institution's procedure, all reports, comments, &c., from individual members of the Panel and from outside bodies were duplicated at headquarters and circulated to every member of the Panel, so that all should be familiar with the progress made at each stage, thus greatly facilitating the work, and preventing waste of time at Panel meetings.

As an indication of the amount of work involved, it is interesting to note that during the experimental work 30 different coals were tested by 11 different observers. Probably more than 800 individual crucible tests were carried out in addition to a large number of tests made by members using alternative methods. During the two years or so in which the work was going on, the correspondence received by each member of the Panel from B.S.I. headquarters amounted to about 140 pages of typewritten foolscap, and, finally, I may add that the draft specification occupies only a couple of sheets of foolscap, together with two diagrams.

Coal and Coke Sampling.

Among the most generally useful specifications issued by the British Standards Institution are surely those dealing with the Sampling of Coal and Coke. These methods, as many members will be aware, are based upon the work of Dr. E. S. Grumell and Dr. A. C. Dunningham, who were the first workers to apply the Theory of Errors to this particular problem.*

In view of the sound basis on which the practice of sampling is now placed, of the reasonableness of the size of sample, and of all that has been said and written concerning the importance of this matter, one would have thought that the recommendations would have been well nigh universally adopted, in this country at any rate.

Personal observation, however, leads me to suppose that this unfortunately is far from being the case. True, the work of sampling has often to be undertaken under adverse conditions, while it is in any case a somewhat dirty business.

Nevertheless, it is essentially one of those jobs which, if worth doing at all, is worth doing well; otherwise it is likely to be a sheer waste of time.

There are many pitfalls to be guarded against in the work of sampling to which I cannot draw your attention

* B.S.I. Publication No. 403/1930.

here,* but I would stress the importance of the human element. Only a thoroughly conscientious man, properly instructed and adequately provided with the necessary tools and facilities, should be employed.

In passing it is worth noting that having set the sampling of materials on a sound basis, it now becomes possible to place greater reliance on the results of small-scale tests than hitherto—a factor which may considerably influence our methods of testing in certain directions.

Perhaps I may also draw attention to the fact that it is not always advantageous to take a single sample which will be adequately representative of a large consignment or "make" of material. For instance, in the case of domestic coke sales the best practice will often be simply to take a 1-cwt. bag at random and let this be one sample. This amount may be an almost infinitesimal proportion of even a day's make on a very large works, but looking at it from the customer's point of view we must recognize that in many cases a single bag will be a whole week's supply—and a week of burning an indifferent sample of coke may mean a week of considerable irritation in many a household. As previously stated, it would, of course, be impossible to regard a sample taken in the above manner as representative of even an hour's make, but if such samples are taken, say, twice a week valuable data will have accumulated in the course of a year. Obviously, the arithmetic mean may be regarded as a reliable average value, but further examination of the results of, say, moisture content, or combustibility index, in the light of the Theory of Errors will yield valuable information.

* See C. W. H. Holmes, Colliery Engineering 11 (1934), 24 *et seq.*

Wales and Monmouthshire Juniors

Opening Meeting

The opening meeting of the new session of the Wales and Monmouthshire Junior Gas Association was held at the Offices of the Cardiff Gas Company on Saturday, Oct. 16—Mr. J. H. CHAPMAN (Swansea), the retiring President, occupying the chair.

It was agreed that a letter of good wishes for a speedy recovery should be sent to Mr. J. H. Canning (Newport), who recently suffered a severe accident.

Mr. CHAPMAN referred to the excellent programme which had been drawn up by their new President, Mr. H. V. Williams, and commented upon the fact that Mr. Williams had a long record of service with the Association.

PRESIDENTIAL ADDRESS

of

H. V. WILLIAMS, of Cardiff.

Having completed one hundred years' faithful and continuous service to their consumers, the Cardiff Gas Light and Coke Company, facing more intense competition, are embarking on their second century with greater vitality than ever in their capacity of "Public Servant No. 1." The century of service achieved by the Cardiff Company could only be the result of difficulties overcome and consumers' requirements anticipated in all spheres of gas service.

Although it is as true to-day as when first said that profits are made in the retort house, a gas undertaking must now look for dividends still further afield. The high prices prevailing for coal, however, make it increasingly necessary that skill and knowledge based on research work should be fully applied in the retort house.

With the migration of urban population to garden suburbs, in many cases miles away from the centre of the town, the increased cost of distribution must be an ever-present anxiety to those responsible for its development. On the question of distribution, it is well to remember that with the artistic variety now presented by gas appliances the usefulness of the appliance must also be kept well to the forefront. While the artistic taste of those who demand coloured appliances must be satisfied, it must be remembered that the housewife who has to provide meals might be far more concerned with a cheap source of cooking than the artistic merit of the appliance. In the direction of improved appliances, it is gratifying to note the advances made in the provision of artistic gas lighting fittings. Our showrooms are continually exhibiting fresh examples of the specialist's art. This is a move which I regard as being all to the good.

Public conscience being aroused, ever-increasing attention is being devoted to the question of smoke abatement. This work has led to due consideration of the excellence of gas coke as a smokeless fuel both for industrial and domestic purposes. Another by-product, the more general use of which must be a source of satisfaction to the pioneers who did so much to proclaim its merits for road surfacing purposes, is tar. Despite the endeavours of those pioneers, however, there still remains much to be done in the matter of interesting those responsible for the construction and maintenance of roads; of giving due prominence to its dust-free and non-skid properties, and drawing attention to the economies that can be effected by its use. There is also the very important fact that tar is an all-British product, whose use in greater quantities would tend to improve conditions in the coal industry.

We have behind us a past resplendent with wonderful achievement. But that is now history; and one is prompted to ask what lies before the Gas Industry.

In Cardiff we are fortunate in having an up-to-date showroom, where consumers can examine any appliance they choose at their leisure. The beauty, colour, and design of the modern gas appliance create more than passing interest, but low cost, high efficiency, and carefree working must be demonstrated to the consumer. Beyond doubt we shall be faced with a period of still keener competition, but this will be successfully met by that skill and perseverance which has always been a characteristic of those employed in the Gas Industry. Much can be achieved by individual effort, and so let every one of us pull his weight and carry out his job with tact and intelligence, ever remembering that even the least of us can contribute in some small measure to the success of the undertaking by which we are employed.

THE PRESIDENT.

Mr. H. V. Williams was educated at the Canton High School and Technical College, Cardiff, being subsequently indentured for four years to Mr. H. D. Madden as a mechanical engineer with the Cardiff Gas Light and Coke Company. After a year's experience on the gas-works, he was appointed, in 1929, to the Distribution Department as chief assistant to the Distribution Superintendent. Mr. Williams holds the ordinary and higher grade certificates in Gas Engineering and the ordinary certificate in Gas Supply.

Mr. A. E. PASK (Caldicot) proposed a vote of thanks to Mr. Williams and Mr. D. E. CROWLEY (Newport) seconded.

Mr. H. MAYCOCK (Abertillery) and Mr. W. R. BRANSON (Cardiff) also added their appreciation, the latter appealing to the members to give the new President their fullest support.

Responding, Mr. WILLIAMS presented the Past-Presidents' certificate to Mr. Chapman.

In proposing a vote of thanks to Mr. R. Snelling (Newport), the retiring Hon. Secretary, Mr. C. BARTLETT (Cardiff) pointed out that all the previous Secretaries of their Association were present that day. Mr. K. M. ERNEST, the new Secretary, also added his testimony to the work of his predecessor, and said he hoped he would be able to live up to the fine example set by Mr. Snelling.

SCOTTISH WESTERN JUNIORS

Presidential Address

OF

R. A. MacLAREN, Newton-on-Ayr

Delivered at the Opening Meeting held at the Royal Technical College, Glasgow, on Saturday, Oct. 9.

THE PRESIDENT.

Mr. R. A. MacLaren received his technical training at the Royal Technical College and University, Glasgow, subsequently joining the staff of Messrs. Jas. Nimmo & Co., Ltd., at their Auchengeich coke oven plant. Later he served on the staff of the Glasgow Corporation Gas Department at their Dawsholm Works. In 1927 he was appointed Assistant Engineer and Manager of the Newton-on-Ayr Gas Company, becoming Engineer and Manager on Mr. John Gibb's retirement in 1932.

Water, though plentiful, is not always available in sufficient quantities at the right place at the right time. This was the peculiar difficulty of the Company I serve prior to the spring of 1935. So bad was the supply that water could not rise beyond the first storey of the retort house after 10 a.m. during summer months. It will be readily appreciated what a great inconvenience this was, with all the attendant troubles that arose from inefficient condensation. It is my firm conviction that gas should be stable after leaving the condensers and free from all tar fog. Shock condensation does this very effectively. Hence I sought an adequate supply of water.

After consultation with the Burgh Surveyor and Water Engineer, I had the following alternatives:

(1) Lay in a 3 in. water main with hydrant from another street at opposite side of the Works at a cost of £75, including all charges.
(2) Put down an underground tank of sufficient dimensions for our purpose and pump water required, using the existing water supply at approximately the same cost.
(3) Find an independent and private source of water in works for our own use.

After due consideration of all three methods, it was a question of whether I could procure a private source of water suitable for all purposes at an all-in cost low enough to show a profit against town water at the industrial rate of 10d. per 1,000 gallons.

Preliminary Steps.

An old ordnance survey map of the district showed three separate shafts of disused coal mines in the district, all on the north of the river Ayr. I knew that there was an artesian well some 300 ft. deep within 100 yd. of the proposed site which had been pumping continuously for a considerable number of years. On the other hand, bores had been put down at Ayr Harbour to the south of the Gas-Works and at a factory some 400 yd. to the north of that, without result, the latter to a depth of 1,500 ft.

Reference to the map showed a rock formation starting from north side of Ayr pier and passing just north of the Gas-Works, and running inland separating the second of above-mentioned bores and the Gas-Works. Having got thus far, I consulted a well-known firm of mineral borers and got a price for sinking a bore 8 in. in diameter. The price was given per foot of bore with an estimate that water could be expected at about 200 ft.

A further examination of the map showed a 4 ft. thick dyke of whinstone at right angles to the one running inland; from this it was expected that no salt water would be tapped.

I presented my proposition to my Directors, and the case I put up was on these lines:

Average total requirements of Works was estimated at 30,000 gallons per day.

	£	s.	d.
Costing at 10d. per 1,000 gallons per day	1	5	0
Or cost of town water per annum	456	5	0
Estimated cost of sinking bore to 200 ft.	220	0	0
Cost of pump, piping, &c.	50	0	0
Allowing 10% for contingencies	27	0	0
Total	£297	0	0 (say £300)

Estimating the life of well at the very conservative figure of 20 years, the annual cost to Company would be £15 per annum *plus* (say) 10% *plus* pumping charge, allowing for steam used and renewals to pump. On a basis of 30,000 gallons per day, the above charges work out at 10·85d. per day. Dividing this figure by 30 gives cost of:

	d.
Per 1,000 gallons	0·36
Plus 10% say	0·04
Plus steam charges and renewals of pump	0·60
Total cost per 1,000 gallons	1·00

This figure shows a saving of 9d. per 1,000 gallons or on the 30,000 gallon per day basis, a saving of 22s. 6d. per day of £410 12s. 6d. per annum.

The proposition then was: Did this potential saving warrant an estimated expenditure of £300, with the *proviso* that we might not find water at a suitable depth.

In these figures no account had been taken on credit side of the potential saving of meter replacements due to condensation and gumming up of valves and loss of revenue due to same failing to function, together with annoyance to consumers, &c. My Directors agreed to my project and work was commenced in January, 1936.

Description of Work.

A site was chosen convenient to the pump house. There was just sufficient room between a small gasholder and the pumphouse for the erection of a three-legged derrick, having a heavy lifting tackle suspended. Initial operations were by hand. A 10 ft. length of steel tube 8 in. internal diameter with top end threaded internally and bottom end cut to form a number of teeth was inserted into a hole dug by hand to a depth of 3 ft. The 8 in. tube was clamped to a lever made with wood with arms extending 6 ft. on either side. A continuous flow of water was led on to discharge into the excavation. The 8 in. tube was rotated by four men, and at every second turn lifted bodily and dropped, thus forcing its way into hole. Progress was very slow at first, taking two days to do the first 10 ft. Thereafter the boring was done mechanically. A chisel-shaped tool was lowered, connected by 2 in. steel rods in 10 ft. lengths to a petrol motor.

The first 30 ft. was through rubble, sand, and gravel. As the boring proceeded the 8 in. pipe was forced further down and other lengths screwed into place. The displaced material formed a kind of slurry with the water and was brought to the surface by means of a 6 in. tube lowered through the 8 in. tube. The former was fitted with a flap valve which was vertical when forced into slurry and shut horizontally on being raised. The raising of boring rods and slurry lifter was affected by tackle suspended from a derrick. One of the chief difficulties was to keep the bore reasonably vertical. There was a fair amount of water in the gravel beds in the first 30 ft., but as this was more or less surface water it could not be relied upon to remain of reasonably constant quality and quantity.

At 30 ft. whinstone was encountered. The 8 in. tube was embedded in the whinstone for a matter of 6 in., grinding away the stone by rotating the tube. The water was then pumped out and the bottom of the tube cemented into the whinstone with quick drying cement. The striking of the whinstone at that depth had not been anticipated; this, however, saved us having to tube the

whole length of the bore. On the other hand, there was the solid whinstone to bore. This was suitable for forming the sides of the bore with no danger of crumbling.

The method of boring through the rock was by lowering 6 in. diameter lengths of mild steel tube with screwed joints, the bottom of lowest tube was smooth and edge turned away so as to form a V-shape right down the circumference of tube; the top length was tapered down to 2 in. and was fitted with bevel wheel to gear with horizontal shaft. The whole column of 6 in. pipe was lifted by a lever having counterbalance weights a matter of a few inches and some steel shot dropped down the bore.

The 6 in. tube was then lowered and rotated. A continuous stream of water was allowed to flow into bore from the surface to keep the edge of tube cool and to wash away borings. As the bore proceeded the core of rock ascended the inside of the 6 in. tube. Every 3 ft. or so some steel shot was put down the 6 in. tube which duly jammed the core of rock in the tube and the turning movement of the tube broke off that section of rock. The tube could then be lifted to surface. The rock in the tube was removed by suspending the tube from the derrick and hammering it with a large wooden mallet. Then the process was repeated. The whinstone stratum lasted for some 13 ft. and the rate of boring was 2 to 3 ft. per day. The next 30 ft. was through comparatively soft material compared with the whinstone, being light hard clay and flakestones, which, though porous, were quite suitable to form the side walls of bore. At 66 ft. a 1 ft. seam of ironstone was encountered, but after that at 90 ft. a 15 in. seam of coal was found. Presumably it was too small to be worth working. Down to 120 ft. nothing but light flakestone was met. Flakestone, it may be explained, is not a stone at all as its name suggests, but consists of compressed clay which disintegrates on exposure. Some of it is, however, so tightly compressed that it retains its form on being weathered at the surface.

At 120 ft. old coal workings were pierced and the water level in the bore rose to 8 ft. from the surface.

It was now decided to test the bore and boring apparatus was pulled to surface. An air compressor was used to force the water to the surface and directed over a V notch for measurement purposes. The rate of flow was 40,000 gallons per day for eight hours' running. It appeared quite obvious that we had tapped old workings of which there are known to be two or three square miles, all of which are flooded. The water was clear, but had for the first four days' pumping a large amount of coal dust in it. At the end of four days' pumping there was still coal dust present in the water and it was decided to bore a further 24 ft. to form a sort of sump so that the solid particles could settle. This was done and the total depth of well was just over 145 ft. The more water that was pumped, the clearer it became until no traces of coal dust were visible.

Hardness of Water.

A Winchester quart bottle of water from the well was then sent for analysis. It was rather disturbing to learn that the water had some 21° of hardness, about 7·10 being permanent and 13·65 temporary, both in grains per gallon.

An analysis of water from neighbouring artesian well, already mentioned, showed a total hardness of 13·01, all temporary, but it was some 200 ft. deeper. So we had the pretty problem of whether to sink the well a further 200 ft. or treat the water we had already tapped. We were advised by the borers to give the well a trial as it stood. It is a peculiarity of boring that although water is tapped at one depth, instead of improving on going deeper, the water is sometimes lost altogether. The reason for this is that water is usually lodged between two impervious strata and if the lower stratum is pierced, another outlet is found by the water. We were also advised that the source of water was practically inexhaustible as there were two to three square miles of old workings all flooded with spring water.

As may be imagined the temporary hardness was the worst feature of the water. A pump was installed and water pumped through the water tube condensers and discharged into an overhead tank for a boiler, and a line run to feed the discharge boxes of retorts. The waste-heat boiler was kept on town supply. The Lancashire boiler was blown down every eight hours, and was in fair condition after two months' working.

Unfortunately, the temporary hardness was thrown down when the water was heated on passing through the condensers and duly choked up a 6 in. connection to a sewer, to which the overflow was run. This proved a source of great worry to local officials concerned, as the water looked innocent enough and quite clear on passing into drain. Of course, it was hot and the calcium carbonate was only deposited on cooling.

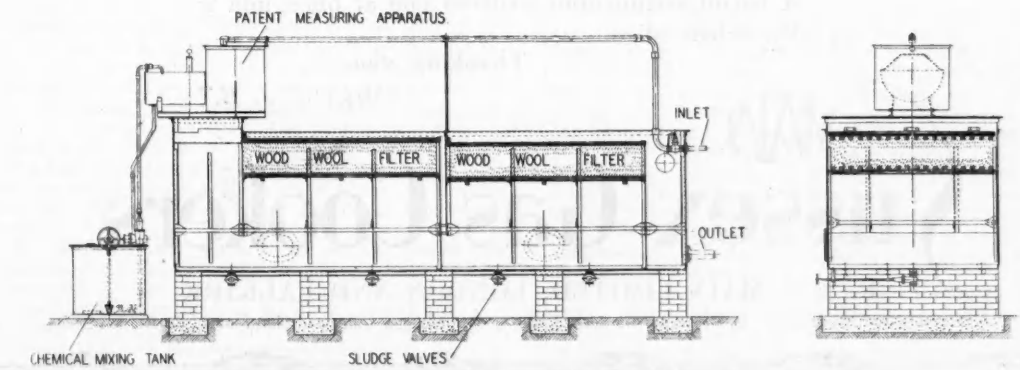
A catchbox, having two weirs, was put down and the water passed through it before entering sewer, but trouble was still experienced. After six months' running, the overhead tank feeding the boiler had accumulated 2 ft. of calcium carbonate, and it was obvious that something drastic would have to be done about it. So here we were back again at the problem of whether or not to sink the well deeper with all the risks attached, and, even if successful, probably get a water having a total hardness of 13 grains per gallon, all temporary. Treatment of the water inside the boiler was also considered, but even if successful this was only meeting half the problem.

Some three months were spent exploring the best methods of treating this water. We had already spent some £200, and the problem occasioned considerable thought. Several schemes for internal treatment were put up, but I was convinced that the treatment must be external and that all the water pumped must be treated.

In November, 1936, I recommended my Directors that a Larsen Hjort external softening plant should be installed at an all-in cost of £450, capable of treating 1,700 gallons per hour or 40,000 gallons per day, which was duly agreed to. Allowing 10% on capital and a consumption of 30,000 gallons per day, the standing charge against plant on 20-year basis works out at 1s. 4d. per day or 0·53d. per 1,000 gallons. The estimate for treating water was 3·8d. per 1,000 gallons and this proved accurate and has never been exceeded.

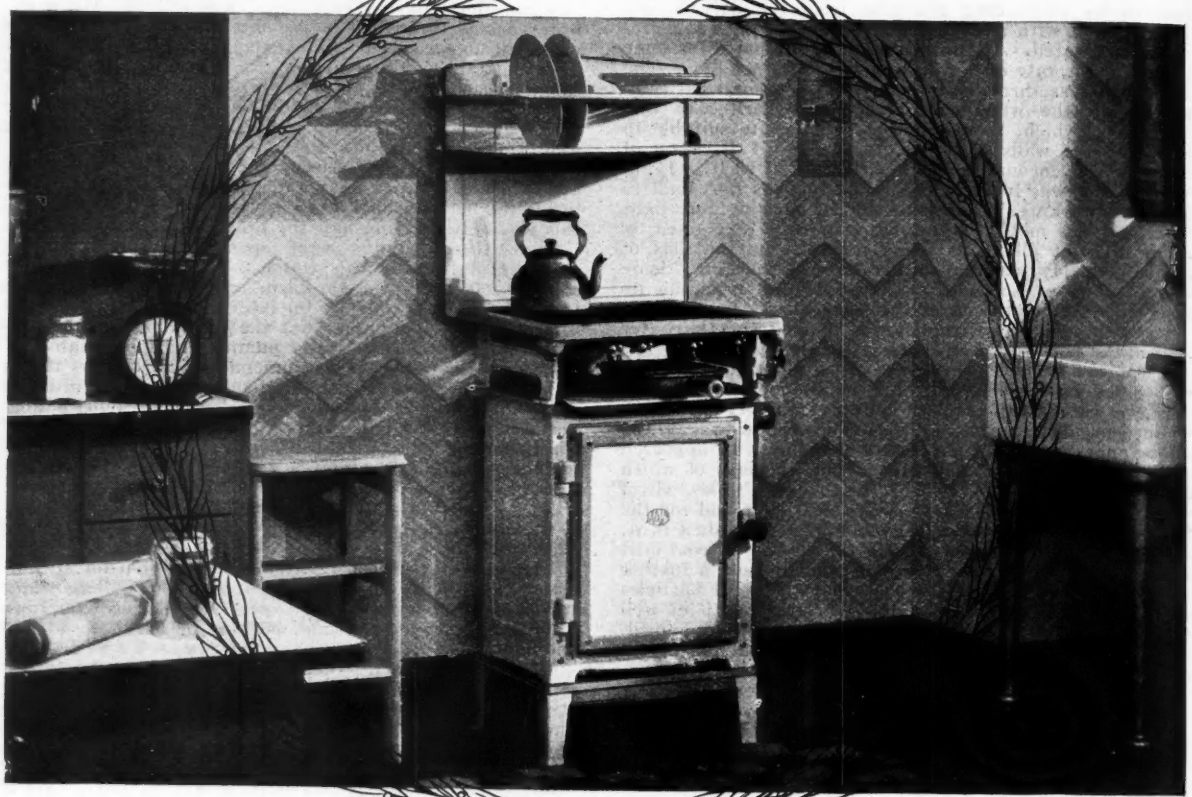
The total cost of water softened and filtered for all purposes was thus estimated at 5·33d. per 1,000 gallons which still showed a saving of 4·67d. per 1,000 gallons over town water, amounting to 11s. 3d. per day or £212 18s. 4d. per annum.

Mr. MacLaren then went on to describe the water softening plant, which is shown in diagrammatic form in the accompanying illustration. The main principle on which plant functions is that the chemical dosing should be proportional to the water passing through the plant. To effect this a reliable method of measuring quantity of water is required, and this is done by the Larsen Hjort measuring apparatus and chemical container. Water is pumped from the well direct to the measuring apparatus, which consists of two gravity tip buckets each controlled by a ball valve. When the bucket is full, the ball rises and a vertical spindle mounted on the ball arm and fixed in guides so as to operate vertically releases a catch, and the bucket tips over and water descends into main settling tank; the spindle to which the buckets are attached carries right through to the chemical container. A section of this spindle has a small crank or offset to which is attached by two small arms of equal length a vertical spindle operating



Water Softening Plant at the Newton-on-Ayr Gas-Works.

Tribute to a fine product



A customer writes

"..... Am delighted with my (large size cream and green) Cooker. Have had it 12 months now—most economical to run, easy to cook with, and a beautiful adornment for my kitchen.

A friend seeing mine ordered one at once, and is equally delighted.

Thanking you,
(*Mrs.*) *G. J. B.*"

MAIN

Sussex Gas Cookers

R. & A. MAIN LIMITED, LONDON AND FALKIRK

London Office and Showrooms: 48, Grosvenor Gardens, S.W.1 Glasgow Office and Showrooms: 82, Gordon Street

a valve in the bottom of the chemical container. Every time a bucket tips, the horizontal spindle turns and lifts the valve in the base of chemical container allowing a measured quantity of chemical reagents to fall into the main tank beneath and mix with the water. As the water and chemicals discharge they pass down a small alleyway together, and are thus helped to mix right away.

The chemical mixing tank is on ground level and is fitted with a pump to raise chemicals to the container above. It is fitted with a horizontal level with crank to operate the pump and meets a vertical spindle with bevel gearing. The bottom of the vertical spindle is fitted with a horizontal paddle so that chemicals are always stirred before being pumped to the container above.

The main body of the tank is divided into three parts—two filters and an end section for softened water. The flow is upward through the first filter over a weir down and up through the next filter, discharging into end section; and the process should now be complete.

Softened water is drawn from the end compartment of the softener by a pump and discharged through water tube condensers to an overhead tank and thence to the boiler, coke discharge boxes, and waste heat boiler, with an extra connection for spraying coke in the yard.

At the conclusion of his Address, Mr. MacLaren acknowledged his indebtedness to Messrs. Alfloc, Ltd., for their assistance and guidance in controlling the plant in the initial stages and since, and to Messrs. United Water Softeners for a first-class job.

Discussion

Mr. STURROCK (Greenock) sympathized with Mr. MacLaren in having to pay 10d. per 1,000 gallons for water and said that they were slightly more fortunate in Greenock with a charge of 6d. per 1,000 gallons. He would like to know if the 3·8d. mentioned by Mr. MacLaren as the cost for treating water included labour charges. It was indicated in the Paper that a saving would accrue if the hot processes of water softening were adopted. What was the amount of saving?

Mr. GREIG (Glasgow) wanted to know the temperature of the water and if it varied very much.

Mr. BATEMAN (Kilmarnock) was very much interested in the report of the boring and from what he could gather he had very definite foundations for new plant at a future date.

Mr. JONES (Falkirk), referring to the condensation in meters, presumed that the trouble experienced on the district would now show improvement both in respect of the meters and the lessening of the expenditure on the meters. Mr. Jones questioned the measuring of water with a " V " notch and asked if this was a precise measuring instrument duly calculated and calibrated or just a rough and ready guide. Was this method applicable to measuring the flow of water in other plant?

Mr. F. L. MACLAREN remarked that in the past, aspiring Gas Managers had been the Presidents, but the order appeared to have changed and a fully fledged Manager was now occupying the President's Chair.

Mr. D. FULTON (Helensburgh) suggested that the sinking of a bore had been brought out to be a somewhat speculative business, but it ought not to be, because there are people walking about to-day who could divine where water should be and he thought that this method ought to have been adopted. They were certain to tap water in this area because of it being a colliery district and he thought they were well advised to accept the advice of the borers when they said to give the water a trial where they had found it. On the matter of costs, he thought that they were a little obscure and required more explanation.

Mr. HANNAH (New Cumnock) wondered if the costs given included all charges for manual labour in respect of operating valves, &c. He would also like to have had a little more information on the results of continuously blowing down the boiler and of the sludge accumulation in the bottom of the boiler.

Mr. WEBSTER (Port Glasgow) asked Mr. MacLaren to give him the costs of zeolite treatment as against the lime soda method.

The Author's Reply.

In reply to Mr. Sturrock, Mr. MACLAREN said that the 3·8d. was purely a chemical cost, as no extra men were required to look after the plant. Replying to Mr. Greig, he said that the average temperature of the water was 55° F. at present, but it might be 10° less in the winter months; that point he had still to find out.

In reply to Mr. Jones, the Author said that if the condensers were at all inefficient at the works, then condensation in the mains and meters would be great. In order to stabilize the gas as far as possible in respect of moisture content they had a 1¼ in. layer of oil in the holder and already they had found that the condensation had been reduced by about two-thirds and the meter repair bill had also been lowered. The " V " notch referred to was a well-known way of measuring water and he had checked the delivery by a meter and found it to be quite an accurate estimate of the water passing. Replying to Mr. Hannah, he said the real objective of the automatic blowdown was to keep down the density of the water in the boiler and this was working in conjunction with the ordinary blowdown at regular intervals. The automatic blowdown really functioned as a scum cock.

In reply to Mr. Webster, Mr. MacLaren said that he had no costs for zeolite as against the lime method so far but the aluminate was really a zeolite and it was generally reckoned that one could work to a finer limit using zeolite.

Midland Junior Gas Association

First Meeting of New Session

The first meeting of the new Session of the Midland Junior Gas Association was held at the Gas Offices, Birmingham, on Thursday, Oct. 7, when Mr. E. T. Pickering, B.Sc., A.I.C., Central Laboratory, City of Birmingham Gas Department, read his Presidential Address.

Mr. F. A. JENKINS, the retiring President, congratulated the members of the Association who were successful in The Institution of Gas Engineers 1937 Examinations. He announced that Mr. W. N. Smirles (Birmingham) had been awarded the Milbourne Medal for his Paper on " Domestic Hot Water Systems and Circulators " read during the previous Session.

Mr. Jenkins then said that his last duty as President was to install Mr. E. T. Pickering in the office of President. Mr. Pickering needed no introduction, as he was known to all the members of the Association as a man of great ability and one who had been an enthusiastic member of the Association since 1916.

Mr. PICKERING on taking the Chair said his first duty and privilege was to propose a sincere vote of thanks to Mr. Jenkins for the excellent way in which he had upheld the high standard of the Association during his term of office, and the dignity and charm with which he had presided over the various meetings. The Session had been a most successful one, due, in no small measure, to the part Mr. Jenkins had played as President.

It gave him much pleasure to propose a vote of thanks and to ask Mr. Jenkins to accept a replica of the President's badge.

Mr. J. H. WAINWRIGHT (Halesowen), who seconded the vote of thanks, reminded members that Mr. Jenkins was a founder member of the Association, and he thought it must be very gratifying to him to have served the Association from its early days and to have received the highest honour that the Association could bestow.

In asking Mr. Jenkins to accept the sincere thanks of the members for all he had done during his term of office, Mr. PICKERING expressed the hope that he would long remain an active member of the Association.

Mr. JENKINS, in reply, said he had approached his year as President with great trepidation, but owing to the able and loyal support he had received from all concerned, his period of office had been a very happy one.

Mr. E. T. PICKERING then read his Presidential Address, which will be found elsewhere in this week's issue.

At the conclusion, Mr. A. W. ATTWOOD (Coventry) proposed a vote of thanks to the President, which was seconded by Mr. W. N. SMIRLES (Birmingham), and supported by Mr. F. A. JENKINS and Mr. F. A. C. PYKETT.

Mr. J. H. GEE (Central Laboratory, Birmingham) said he would like to take the opportunity of expressing the appreciation of the Staff at the Central Laboratory at the honour done them in electing their colleague as President.

Scottish Eastern Juniors

Visit to Messrs. John G. Stein's Castlecary Works

On Oct. 2, members of the Scottish Junior Gas Association (Eastern District) visited the Castlecary Works of Messrs. John G. Stein & Co., Ltd., at Bonnybridge. The visitors were cordially welcomed by Colonel Stein and members of the staff before embarking on a tour of the works.

In the research laboratories all types of apparatus for the testing of raw materials and finished products were explained and examined. Owing to the specialized nature of the work carried out in the laboratories, many pieces of apparatus have been specially designed by the Company's staff. The raw material for the high-grade refractories manufactured by the Company is obtained from its own mine within the works.

The tour of the works over, the visitors were entertained at tea, after which Colonel Stein expressed his pleasure that the Association were able to visit the works. Replying on behalf of the Association, the President, Mr. A. C. Rea (Perth) thanked Colonel Stein and his staff for a very pleasant afternoon.

Paisley's Waterless Holder Inaugurated

Councillor Muter on Coal Prices

In the presence of gas engineers and managers from a wide area, members and officials of the Paisley Town Council, and representatives from surrounding burghs, ex-Bailie Black on Oct. 21 performed the inaugural ceremony in connection with Paisley's new £37,000 waterless holder.

The new holder, which has a capacity of 2 million cu.ft., has a diameter of 123 ft. 9 in., and is 188 ft. in height. The total weight of the steelwork in the holder is 628 tons.

In the course of his remarks, Bailie Black said there were two reasons for the erection of a new holder. One was the expansion of business and the second was the deterioration of the present gasholder. It was a striking tribute to old holders that they had stood for sixty, seventy, and eighty years. The new holder had been erected by Messrs. Robert Dempster & Sons, Ltd. The foundations were laid in April of last year, and the erection commenced in August of the same year. It would be a fitting memorial to their highly esteemed Manager, Mr. Nisbet, for his faithful, efficient, and conscientious work. No Corporation had a better official.

At the luncheon which followed in the Town Hall, Provost Ballantyne presided, and extended a welcome to the guests.

In reply, Councillor Walter Muter (Edinburgh) said they were grateful for the tribute paid to their esteemed colleague and friend, Mr. Nisbet, who by his qualities of heart and mind commanded the respect and admiration and whole-hearted friendship of everyone in the Gas Industry. They paid tribute to him not only as an engineer but for his judgment and prescience in connection with the new gasholder. Referring to the price of coal, he said that the Gas Industry had now reached the end of its forbearance in the matter. If other contractors had adopted the same recalcitrant attitude, where would the Gas Industry have been to-day? The Department of Mines, the Government, and the coalmasters were not amenable to reason on the question of prices. The gas undertakings, in common with other public undertakings, must no longer wait on the doorstep in connection with the matter. They should take some action within St. Stephen's to bring the Government and the coalmasters to reason on the vexed question of prices. He hoped he would not be considered impertinent if he gave some advice to the Paisley Corporation. He thought they would be well advised to consider the possibility of dealing with the Gas Industry as they did with the electricity side of their business.

The toast of "The Gas Industry" was proposed by Provost Ross, of Johnstone.

Replying to the toast, ex-Bailie Black said he had been for six years connected with the Paisley Gas Committee. The town had had four managers since 1870—Messrs. Cook, Foulis, Hislop, and Nisbet. Mr. Nisbet had been associated with the Gas-Works for 44 years—twenty as Manager—and under the superannuation scheme would be retiring in a year or two, but the splendid service he had given the Corporation would always be remembered.

Giving the toast of "The Contractors," Bailie Gregg, Vice-Convener of the Paisley Gas Committee, said that the firm of Robert Dempster & Sons had been established for 82 years. Paisley was the fifth place to have a waterless gasholder in Scotland.

Presentations were made to ex-Bailie Black and Bailie Gregg by Mr. W. H. Handley, of Messrs. Dempster & Sons.

Mr. Nisbet was called upon to speak, and in the course of a few remarks said that he thought every revenue producing undertaking should finance its own expenditure. A vote of thanks to all who had taken part in the proceedings was moved by Mr. George Braidwood, President of the North British Association of Gas Managers.

Coal and Coke Prices

Lytham St. Annes Engineer Discusses Position

Speaking at the opening of the new carburetted water gas plant at Lytham St. Annes on Oct. 19—reference to which was made in the "JOURNAL" last week—Mr. J. H. Ranft, the Borough Gas Engineer and Manager, referred to the fact that the Lancashire Associated Collieries are now asking from his Council an increased price for coal of 6s. per ton over the 1935 prices, and that he had every reason to believe that the figure they were aiming at in a few months' time was 10s. per ton increase.

That there was no great outcry from the Gas Industry was due to a very great extent, said Mr. Ranft, to the fact that they were able to obtain increased prices for coke, which offset the additional cost in some measure. In a short time, however, this state of affairs would cease, as coke oven plant was being erected to produce a further 7,500,000 tons of coke over and above the 1935 figure (which was a peak year). This increase was equivalent to 40%, and it was anticipated that this amount would be available on the market towards the end of 1938.

Even if the present boom in steel continues beyond that date there would be a surplus of some 4 million tons of

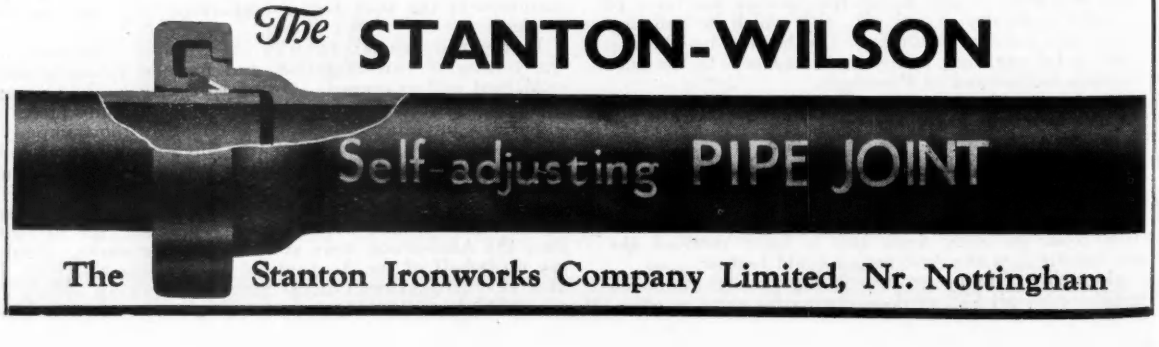
Traffic Vibration
Rigid or Self-adjusting Joints?

Not many of the problems brought into being by the remarkable growth of road transport during the last decade are capable of easy solution.

There is at least one exception, however. For instance, though much has been heard of the danger caused to historic buildings by traffic vibration, the harmful effects of such vibration on water and gas mains are not so apparent. To water and gas engineers responsible, however, for the maintenance of these essential public services, this was a very real problem until a few years ago, for rigidly-jointed mains could not be expected to withstand the severe vibration caused by modern conditions.

Some six years ago the Stanton Company introduced the Stanton-Wilson Self-adjusting pipe-joint to overcome this and similar difficulties. That it has successfully done so is proved by the fact that more than 1,500 miles of Stanton-Wilson mains have now been laid by over 750 public authorities.

The STANTON-WILSON

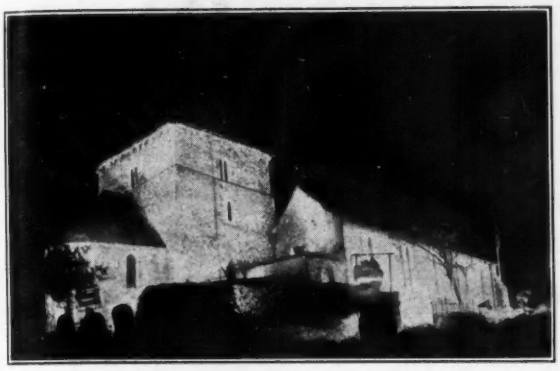


The Stanton Ironworks Company Limited, Nr. Nottingham

coke which would be thrown on the market. To give an idea of what this amount means, the whole of the coke produced by members of the London and Counties Coke Association is about 3,500,000 tons, while the amount exported last year was 986,000 tons.

The inevitable result would be a heavy fall in coke prices; and although there might also be a fall in coal prices, it would not be to a corresponding degree. Therefore, observed Mr. Ranft, it behoved the Gas Industry to explore every possible means of manufacture which might include the substitution of coal gas by water gas.

Newhaven Parish Church Floodlighted



Our photograph shows the pleasing results which have been obtained by the gas floodlighting of the fine old Parish Church at Newhaven. Mr. A. A. Lucas, Secretary and Manager of the Newhaven Gas and Coke Company, states that the equipment was kindly loaned by the Eastbourne Gas Company, who also co-operated in the installation. The photograph was taken by J. J. Hill, of Newhaven.

A Hundred Years of Mechanical Engineering*

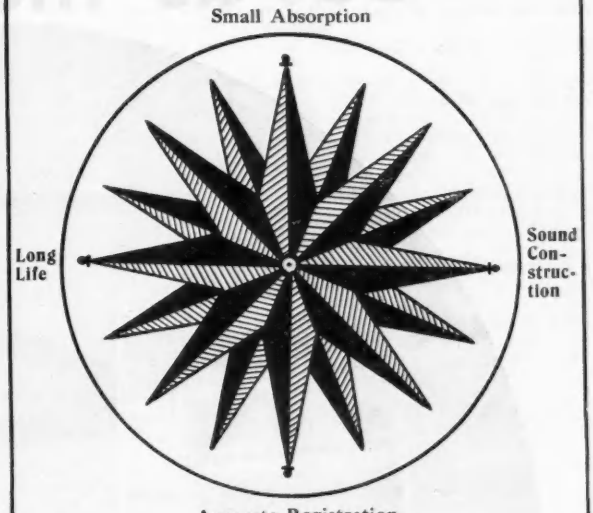
This book presents an outline of developments in the more important departments of mechanical engineering and in its application to a number of other industries during the last one hundred years. In writing it the Author has had in mind mainly those who have recently entered the profession, and who find themselves in a more or less narrow and specialized field of activity with a long history and a wide range of contemporary interest. But he has also felt that there may be many others interested in mechanical engineering, or engaged in some branch of it, who would welcome an historical and contemporary setting to their own experience.

The field is a wide one, and, considering all its implications, the space that the Author has devoted to the Gas Industry is not to be criticized on the score of its length; one, however, cannot altogether repress a desire to state it could have been longer without impairing the interest of the reader. But then the Gas Industry is a combination of various branches of mechanical engineering, dealt with in other chapters, rather than a branch in itself. The Author states that it is largely to the Gas Industry that the world owes the present advanced technique in internal combustion engines. It was the availability of a supply of gas early in the nineteenth century that acted as a great stimulus to inventors in their efforts to produce an internal combustion engine. The development of the gas engine is traced in a very interesting manner, and details are given of some very large installations. Naturally, in the course of his short description of the process of gas manufacture, the Author has considered such aspects of mechanical engineering as coal and coke handling, retort charging, and steam raising rather than aspects of chemical engineering.

The book is extremely well written; Mr. Cressy has both an extensive knowledge of the principles and applications of mechanical engineering and a keen appreciation of popular taste. He has avoided the many sidetracks, tempting enough in all conscience, and has succeeded admirably in presenting a comprehensive, live history of all branches of mechanical engineering, together with a final retrospect and summary and index within the compass of three hundred and forty pages.

*By Edward Cressy. London: Gerald Duckworth & Co., Ltd., 3, Henrietta Street, Covent Garden, W.C. 2. Price 15s. net.

All the Cardinal Points



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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

Events on Wall Street were responsible once again for severe reactions on the Stock Exchange until about the middle of last week. Latterly, the Italian Government's declaration on the Spanish question led to a good rally and prices recovered substantially. It cannot be said, however, that the volume of business showed any marked increase and, in view of the severe buffeting markets have been subjected to of late, it will probably be some time before confidence is fully restored. Gilt-edged stocks maintained their firmness and again closed fractionally higher, while home rails remained steady. A few favourites in the industrial section made good progress, otherwise quotations finished at about the week's opening level. In the absence of further complications, it is confidently expected that the brighter prospects at the end of last week will be maintained during the current period.

The Gas Market passed through a comparatively uneventful week, though the volume of business was a little heavier and quotations, with few exceptions, closed unchanged. In the Official List, Alliance and Dublin recovered 2 points to 167½ and Gas Light 5% debenture was marked up 1, but the two Brighton consolidateds, Imperial Continental, and Plymouth ordinaries all reacted 2 points. Prices at the Provincial Exchanges remained unaltered except at Newcastle, where the local Company's £1 units fell 4½d. and Hartlepool dropped 4 points to 118.

At the time of writing there are several parcels of gas "ordinaries" on offer which can be recommended and among these are the following:

Amount.	—	Dividend.	Price.	Gross Yield.
£		%		£ s. d.
2,600	Associated Gas and Water £1	5	20s.	5 0 0
8,500	Commercial	5	90	5 11 3
10,365	Gas Consolidated "A" £1	5	21s. 3d.	4 13 0
5,000	Severn Valley Gas £1	2¾ Int.	23s.	4 15 6
15,000	South Western Gas and Water £1	5	20s.	5 0 0
2,470	Tottenham	6¾	135	5 0 0
5,000	United Kingdom Gas £1	5	21s. 6d.	4 11 7
500	Watford	7	145	4 16 7

Interim dividend announcements during the past week included Imperial Continental 4% and South-Western Gas and Water Corporation 2%, the rates in both cases being the same as those paid a year ago.

Current Sales of Gas Products

The London Market for Tar Products.

LONDON, *Oct.* 25.

There are a few changes to report in the prices of tar products, which are as follows:

Pitch, 38s. per ton f.o.b.
Creosote, 6d. to 6½d.
Refined tar, 3¾d.
Pure toluole, about 2s. 5d.; pure benzole, 1s. 9d.; 95/160 solvent naphtha, 1s. 8d.; pyridine is very scarce for early delivery, and the price for 90/160 is said to be 11s. to 12s.; all per gallon naked at makers' works.

Tar Products in the Provinces.

Oct. 25.

The average prices of gas-works products during the week were: Gas-works tar, 24s. 3d. to 29s. 3d. Pitch—East Coast, 37s. to 38s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 37s. to 38s. 6d.* Toluole, naked, North, 1s. 8d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 5½d. to 1s. 6d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5d. to 5½d.; low gravity, 4⅜d. to 4½d. Heavy oils, in bulk, North, 5d. to 5½d. Carbolic acid 60's, 4s. 1½d. to 4s. 3d. Naphthalene, £18 to £20. Salts, 90s. to 95s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Oct.* 23.

This market continues very quiet and, in certain products, distillers have reduced quotations.

Crude gas-works tar.—Actual value is 37s. to 38s. per ton *ex* works in bulk.

Pitch remains without interest although prices are unchanged at round 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar can be secured in substantial quantities at 3d. to 3¼d. per gallon free on rails for export, and 3½d. to 3¾d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil is reasonably active at the following prices: Specification oil, 5½d. to 5¾d. per gallon; low gravity, 6¼d. to 6½d. per gallon; neutral oil, 5¼d. to 5½d. per gallon; all *ex* works in bulk.

Cresylic acid.—In the absence of new business of any moment prices have been marked down as under: Pale, 97/99%, 3s. 10d. to 4s. per gallon; dark, 97/99%, 3s. 6d. to 3s. 8d. per gallon; and pale, 99/100%, 4s. 3d. to 4s. 6d. per gallon; all *ex* works in buyers' packages.

Crude naphtha.—The moderate quantities available readily command round 6d. to 6½d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha is quietly steady with 90/160 grade at 1s. 5d. to 1s. 6d. per gallon, and 90/190 heavy naphtha at 1s. to 1s. 1d. per gallon.

Motor benzole is available at about 1s. 4d. to 1s. 5d. per gallon.

Pyridine.—Prices are nominal at 10s. to 11s. per gallon for 90/160 grade, and 11s. to 12s. per gallon for 90/140 grade.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole	0 9½	to	0 10	per gallon at works
Motor ,,	1 3	,,	1 3½	,, ,, ,,
90% ,,	1 4	,,	1 4½	,, ,, ,,
Pure ,,	1 8	,,	1 8½	,, ,, ,,

Contracts Advertised To-Day

Benzole Plant.

Wallasey Gas Department. [p. 306.]

Gasholders.

Workington Gas Department. [p. 306.]

Water Gas Plant.

Workington Gas Department. [p. 306.]

Gas Undertakings' Results

Hereford.

The annual report of the Engineer and Manager of the Hereford Gas Department, Mr. Arthur Roberts, states that the sales of gas had increased during the past year by 20 million cu.ft. This was an increase of 8·3% and was the largest increase for more than ten years. In spite of the additional expenses the Committee had enjoyed an additional revenue of £4,215 and the Committee were pleased to report that there was a surplus of £2,452. This again was the largest surplus realized during the last ten years.

Oswaldtwistle.

The annual report of Mr. D. J. Colvin, Engineer and Manager of Oswaldtwistle Gas Department, shows a gross profit of £3,393 against £3,716 last year, equal to 13·5% of outstanding debt. The revenue expenditure and income for the year were £18,414 and £21,808, respectively, while the interest on loans, sinking fund, and income-tax absorbed £3,426, leaving a net profit of £361 against £535 last year. The value of appliances sold through the showroom amounted to £3,013 against £4,219 last year. Revenue income from gas totalled £14,874, of which £7,500 was collected from prepayment meters, the average consumption through these being 19,083 cu.ft. The average price received for gas was 2s. 10·08d. per 1,000 cu.ft., or 7·1d. per therm against 2s. 9·85d. per 1,000 cu.ft., or 7·05d. per therm last year. The total capital expenditure on the undertaking amounted to £126,467. A sum of £99,081 had been borrowed and a balance of £27,428 met out of revenue. £74,016 had been repaid, and the net indebtedness of the undertaking is now £24,926, or £237 per million cu.ft. sold as against £23,836, or £220 per million cu.ft. sold last year. The total gas sent out was 108,303,000 cu.ft., a decrease of 4,624,000 cu.ft. over the previous year. Gas sold decreased by 3,507,540 cu.ft., or 3·24%. Unaccounted-for gas had decreased by 1,116,459 cu.ft. and now stood at the lowest figure ever recorded.

THE GLOVER-WEST SYSTEM

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The ease with which heat can be concentrated or distributed at will in the Glover-West vertical retort setting makes possible just that heat treatment required by the particular gas coals available. And this applies to recognised carbonizing coals throughout the world. Many of them have been investigated under full-scale working conditions in the test installation on the research gas plant at our Manchester works.

GLOVER-WEST

CONTINUOUS CARBONIZATION IN VERTICAL RETORTS

WEST'S GAS IMPROVEMENT CO. LTD • MILES PLATTING • MANCHESTER 10

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Oct. 22	Rise or Fall on Week.	Transaction Lowest and Highest Prices During the Week.
1,767,439	Stk.	Sept. 6	8	8	Alliance & Dublin Ord. ...	165—170	+2	168—170½
374,000	,,	June 21	4	4	Do. 4 p.c. Deb. ...	95—100	...	...
558,890	,,	Aug. 9	7	7	Barnet Ord. 7 p.c.	158—163	...	159
300,000	1	Oct. 4	1/9½	1/4½	Bombay, Ltd.	26/—28/-	...	26/9—27/6
179,915	Stk.	Aug. 9	9½	9½	Bournemouth sliding scale ...	200—205	...	203½
590,407	,,	,,	7	7	Do. 7 p.c. max. ...	158—163	...	...
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	133—138	...	...
50,000	,,	June 21	3	3	Do. 3 p.c. Deb. ...	79—84	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	98—103	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	116—121	...	118—119½
357,900	,,	Aug. 9	7½	7½	Brighton, &c., 6 p.c. Con. ...	150—155	−2	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	133—138	−2	138
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	127—133	...	130
855,000	,,	Sept. 20	8	7	British Ord.	146—151	...	...
100,000	,,	June 21	7	7	Do. 7 p.c. Pref.	140—145	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...	...
120,000	,,	June 7	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	102—107	...	...
450,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1½—2½	...	41/6—42/6
100,000	10	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref. ...	1½—3½	...	...
150,000	Stk.	June 21	4½	4½	Do. 4½ p.c. Deb. ...	79—84	...	...
626,860	,,	July 19	6	6	Cardiff Con. Ord.	125—130	...	128
237,860	,,	June 7	5	5	Do. 5 p.c. Red. Deb.	107—112	...	...
98,936	1	Oct. 4	2/-	2/-	Colombo Ord.	12—12*	...	...
24,510	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	23/6—25/6	...	25/—25/6
739,453	1	Oct. 4.	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/—19/-	...	...
296,144	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/—24/-	...	...
1,775,005	Stk.	Aug. 9	5	5	Commercial Ord.	85—90	...	85½—87
620,000	,,	June 7	3	3	Do. 3 p.c. Deb. ...	74—79	...	75
286,344	,,	Aug. 23	5	5	Do. 5 p.c. Deb. ...	113—118	...	...
807,560	,,	Aug. 9	7	7	Croydon sliding scale ...	140—145	...	...
644,590	,,	,,	5	5	Do. max. div.	108—113	...	...
620,385	,,	June 21	5	5	Do. 5 p.c. Deb.... ...	113—118	...	117½
239,000	,,	Aug. 9	5	5	East Hull Ord. 5 p.c....	98—103	...	...
185,355	,,	Aug. 9	6	6	East Surrey Ord. 5 p.c. ...	120—125	...	...
176,211	,,	June 7	5	5	Do. 5 p.c. Deb. ...	113—118	...	...
250,000	1	July 5	4	7	Gas Consolidation Ord. ...	20/—22/-	...	...
250,000	1	May 24	4	4	Do. 4 p.c. Red Cum. Pref.	19/—21/-	...	...
19,255,284	Stk.	Aug. 9	5½	5½	Gas Light & Coke 4 p.c. Ord.	23/6—24/6a	...	23/10½—24/6
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	82—85	...	84—85
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	99—102	...	100½—101¾
2,993,000	,,	July 5	...	3½	Do 3½ p.c. Red. Pref.	100—103	...	102½—102½
8,602,497	,,	May 24	3	3	Do. 3 p.c. Con. Deb....	76—79	...	77—78½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb....	112—115	+1	114½—115
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb....	111—114	...	112½—112¾
700,000	,,	Sept. 6	3½	3½	Do. 3½ p.c. Red. Deb....	94—99	...	97½—98
270,466	,,	Aug. 23	6	6	Harrogate New Cons. ...	115—120	...	...
213,200	,,	Aug. 9	6	6	Hornsey Con. 3½ p.c. ...	118—123	...	...
5,600,000	,,	May 24	8	12	Imperial Continental Cap. ...	133—138	−2	134—138½
223,130	,,	July 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...	...
285,242	,,	Aug. 9	8½	8½	Lea Bridge 5 p.c. Ord. ...	170—175	...	...
75,000	,,	May 24	†10	†10	Malta & Mediterranean ...	150—160	...	...
392,000	—	Oct. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	100—103	...	...
231,978	Stk.	Aug. 23	5	5	M.S. Utility 'C' Cons. ...	101—106	...	...
968,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	96—101	...	...
360,075	,,	June 21	4	4	Do. 4 p.c. Deb. ...	97—102	...	99½
148,955	,,	,,	5		Do. 5 p.c. Deb. ...	115—120	...	...
125,000	—	July 1	3½	3½	Do. 3½ p.c. Rd.Rg.Bds.	96—99	...	...
675,000	Stk.	May 3	†6	†9	Montevideo, Ltd.	91—96	...	...
250,000	,,	Aug. 9	7½	7½	North Middlesex 6 p.c. Con.	150—160	...	...
396,160	,,	Aug. 9	5	5	Northampton 5 p.c. max. ...	110—115	...	111½
300,000	,,	Oct. 18	†7	†9	Oriental, Ltd....	158—163*	−4	157—159
468,537	,,	June 7	8	8	Plymouth & Stonehouse 5 p.c.	155—160	−2	155
621,667	,,	Aug. 9	8½	8½	Portsmouth & Gosport Cons.	164—169	...	166½
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	104—109	...	...
73,350	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
441,275	1	Sept. 20	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	21/6—23/6	...	22/6
460,810	1	,,	-/10½	-/10½	,, ,, 4½ p.c. Cum. Pref.	19/6—21/6	...	...
133,201	Stk.	Aug. 23	5	8½	Shrewsbury 5 p.c. Ord. ...	130—135	...	...
1,371,752	1	Sept. 6	1/2½	1/2½	South East'n Gas. Cn.Ld. Ord.	23/—25/-	...	23/9—25/-
871,636	1	,,	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	20/—22/-	...	20/6—21/-
498,818	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	18/—20/-	...	...
450,000	Stk.	Aug. 9	4	4	Do. 4 p.c. Deb.	99—102	...	...
150,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...	...
6,709,895	,,	Aug. 9	6	5	South Met. Ord.	100—103	...	100½—101½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	130—135	...	...
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	98—101	...	...
1,895,445	,,	June 21	3	3	Do. 3 p.c. Deb. ...	75—80	...	77—78½
1,000,000	,,	July 5	5	5	Do. 5 p.c. Red. Deb....	110—113	...	110—111
1,543,795	,,	Aug. 9	6	6	South Suburban Ord. 5 p.c....	120—125	...	...
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	110—115	...	111½—113½
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	95—100	...	...
250,000	,,	,,	...	§18/9	Do. 3½ p.c. Red. Pref.	98—101	...	...
888,587	,,	June 7	5	5	Do. 5 p.c. Deb....	115—120	...	116
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	98—101	...	...
200,000	,,	Sept. 20	...	3½	Do. 3½ p.c. Red. Deb.	94—99	...	...
427,859	1	May 3	9½	1/2½	S. Western Gas & Water Ord.	19/—21/-	...	19/10½
160,523	1	Apl. 19	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pf.	20/—22/-	...	...
110,000	Stk.	June 21	4	4	Do. 4 p.c. Red. Deb. ...	97—102	...	...
750,541	,,	Aug. 9	5½	5	Southampton Ord. 5 p.c. ...	111—116	...	113—114½
148,836	,,	June 7	4	4	Do. 4 p.c. Deb.	97—102	...	98—99
350,000	,,	Aug. 23	5½	5½	Swansea 5½ p.c. Red. Pref. ...	110—115	...	...
94,000	,,	June 7	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
1,076,490	,,	Aug. 9	6½	6½	Tottenham and District Ord.	133—138	...	133—135
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref....	121—126	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref....	110—115	...	...
371,850	,,	June 7	4	4	Do. 4 p.c. Deb. ...	97—102	...	100
888,629	1	Oct. 4	6	4	U. Kingdom Gas Cor. Ord.	20/—22/-	...	20/3—20/9
968,841	1	May 3	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/-	...	20/9—21/3
745,263	1	June 7	4½	4½	Do. 4½ p.c.2nd Non-Cum.Pf.	17/—19/-	...	...
1,000,000	Stk.	Sept. 20	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...	...
373,939	,,	Aug. 9	7	7	Uxbridge, &c., 5 p.c. ...	138—143	...	9⅞
133,010	,,	,,	5	5	Do. 5 p.c. Pref. ...	109—114	...	...
1,371,138	,,	Aug. 9	7	7	Wandsworth Consolidated ...	140—145	...	111
1,620,615	,,	,,	5	5	Do. 5 p.c. Pref. ...	117—122	...	141½—143½
500,000	,,	,,	4	4	Do. 4 p.c. Pref. ...	97—100	...	...
1,343,964	,,	June 7	5	5	Do. 5 p.c. Deb. ...	115—120	...	98—100
383,745	,,	,,	4	4	Do. 4 p.c. Deb. ...	97—102	...	115½
558,342	,,	Aug 9	7	7	Watford and St. Albans Ord.	138—143	...	...
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	109—114	...	142½
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	121—126	...	...
200,000	,,	June 7	4	4	Do. 4 p.c. Red. Deb.	97—102	...	...
100,000	,,	,,	3½	3½	Do. 3½ p.c. Red.Deb.	95—100	...	100⅜

a.—The quotation is per £1 of Stock. * Ex div. † Paid free of income tax. ‡ For year. § Actual.

Stock and Share List continued overleaf.

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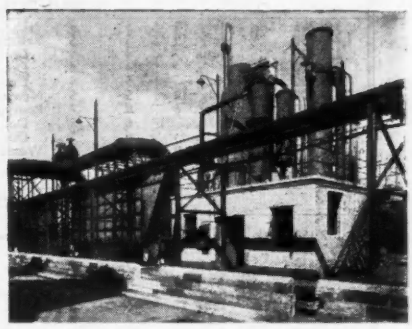

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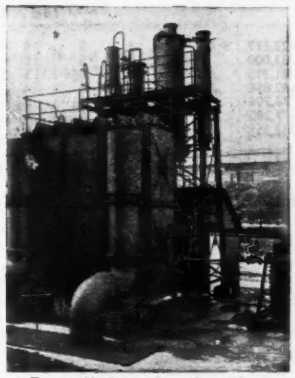

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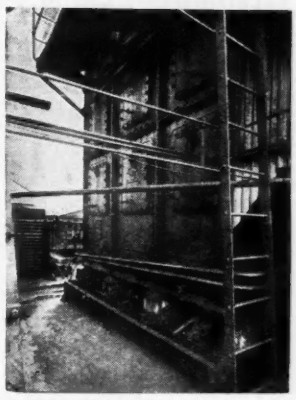

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STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Oct. 22.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	July 19	6	5	Bath Cons.	120—122	...	...
1,667,250	,,	July 19	5	5	Bristol, 5 p.c. max.	117—118	...	...
120,420	,,	June 7	4	4	Do. 1st 4 p.c. Deb. ...	100¼—102½	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100¼—102½	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	120—123	...	...
274,000	,,	July 19	5	5	Newport (Mon.) 5 p.c.max. ...	101—106	...	...
13,200	12	Sept. 6	8	7	Pontyp'l Gas & W. 10 p.c. 'A'	13—14	...	...
13,600	10	,,	6	5	Do. 7 p.c. 'B'	11⅞—12⅞	...	...
40,000	10	,,	6	5	Do. 7 p.c. 'C'	11⅞—12⅞	...	...
140,778	Stk.	Aug. 9	5	5	Weston-super-Mare Cons. ...	110—112	...	...
64,338	,,	June 21	4	4	Do. 4 p.c. Deb.	96—98	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	157—160	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Aug. 9	6½	5	Chester 5 p.c. Ord.	104—109	...	...
92,500	,,	June 21	4	4	Do. 4 p.c. Pref.	97—101	...	...
36,430	,,	,,	3½	3½	Do. 3½ p.c. Deb.... ...	89—92	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	98—102	...	...
2,167,410	,,	Aug. 23	6	6	Liverpool 5 p.c. Ord. ...	125—127	...	...
245,500	,,	June 21	5	5	Do. 5 p.c. Red. Pref. ...	99—104	...	...
306,083	,,	July 1	4	4	Do. 4 p.c. Deb. ...	102—104	...	...
106,280	,,	Aug. 9	10	10	Preston 'A' 10 p.c.	206—216	...	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	147—157	...	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Aug. 9	8	8	Blyth 5 p.c. Ord.	165—166	...	...
732,000	,,	Aug. 9	5	5	Hartlepool G. & W. Cn. & New	117—119	−4	...
2,061,315	,,	Aug. 9	5⅝	5	Newcastle & Gateshead Con.	23/3—24/-ex	—/4½	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	99—100	...	...
776,706	,,	June 21	3½	3½	Do. 3½ p.c. Deb. ...	91—92	...	...
277,285	,	Nov. 2	5	5	Do. 5 p.c. Deb. '43...	108—109	...	...
332,351	,	Aug. 23	6	6	Sunderland 6 p.c. max. ...	139—141	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Aug. 9	9	6	Derby Con.	140—150	...	...
55,000	,,	June 7	4	4	Do. 4 p.c. Deb.	100—105	...	...
20,000	10	June 7	5	5	Long Eaton 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Sept. 20	10	10	Great Grimsby 'A' Ord. ...	210—220	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	210—220	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—210	...	...
1,806,339	,,	Aug. 23	6	6½	Sheffield Cons.	145—149	...	...
95,000	,,	July 5	4	4	Do. 4 p.c. Deb.	100—103	...	...

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Sept. 6	25/-b	5	Ascot Ord.	100—105	...	...
128,182	,,	July 5	5	5	Do. 5 p.c. Pref.	108—113	...	...
573,156	1	May 24	5	5	Assd. Gas and Water Ord. ...	19/6—21/6	...	...
167,506	1	...	...	...	Do. 4 p.c. Red. Cum. Pref.	19/—20/-	...	20/-
253,118	1	...	...	...	Do. 4 p.c. Irred Pref. ...	18/—20/-	...	...
500,000	1	May 24	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/6—21/6	...	...
500,000	Stk.	Sept. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
31,035	1	Aug. 23	...	/4½	Associated Utilities 4 p.c. Pref.	16/6—18/6	...	...
100,000	Stk.	...	...	...	Do. 3½ p.c. Red. Deb.	95—100	...	...
17,000	,,	Aug. 23	8	8	Bognor Orig. Ord. 'A' ...	160—170	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	160—170	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	141—146	...	...
37,440	,,	Aug. 9	10	10	Cam. Univ. & Town 10 p.c.max.	193—203	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	135—140	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	98—103	...	...
65,000	,,	Aug. 9	8½	7½	Eastbourne 'A' 5 p.c. ...	158—163	...	...
198,000	,,	,,	7	6	Do. 'B' 3½ p.c.	128—133	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	108—113	...	...
130,000	,,	June 21	5	5	Do. 5 p.c. Deb.	115—120	...	...
24,000	30	Aug. 23	8½	8½	Great Yarmouth 8½ p.c. max.	44—49	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.	44—49	...	...
51,160	Stk.	June 7	5½	5½	Do. 5½ p.c. Deb.	120—125	...	...
152,600	,,	Sept. 6	9	8	Guildford Cons.	170—175	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
68,250	,,	June 7	5	5	Do. 5 p.c. Deb.	113—118	...	...
156,600	,,	Aug. 23	7½	7½	Hampton Court Cons. ...	158—163	...	...
73,620	,,	Sept. 6	8½	8½	Luton Cons. 'A'	163—168	...	...
107,960	10	Sept. 20	5½	4	Mid Kent Ord.	8⅞—9½	...	...
230,940	Stk.	Aug. 9	10	10	Oxford & District Ord. ...	205—210	...	...
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	108—113	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	110—115	...	...
126,193	,,	May 3	7½	7½	Peterborough Ord.	159—169	...	...
64,990	,,	Sept. 6	7½	6½	Redditch Ord.	125—135	...	...
166,850	,,	Aug. 9	8	8	Romford Ord.	155—165	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Sept. 20	5	5	Do. 5 p.c. Deb.	113—118	...	...
25,570	,,	Aug. 9	5½	5½	Rugby 5½ p.c. Pref.	125—130	...	...
25,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	106—111	...	...
42,750	,,	June 7	5½	5½	Do. 5½ p.c. Deb.	122—127	...	...
10,950	,,	Aug. 23	8	8	Ryde Ord.	158—163	...	...
27,825	,,	Aug. 23	8	8	Shanklin & Ventnor Cons. ...	158—168	...	...
270,086	,,	Sept. 6	7	7	Slough Ord.	135—140	...	...
21,000	,,	June 21	5	5	Do. 5 p.c. Deb.... ...	112—117	...	...
28,872	1	May 24	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/-	...	...
28,866	1	Sept. 6	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...	...
137,730	Stk.	Aug. 9	7	7	Southgate & Dist. 7 p.c. max.	140—145	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
117,228	,,	Aug. 23	5	5	Swindon Cons.	106—111	...	...
60,425	,,	June 7	5	5	Do. 5 p.c. Deb.	110—115	...	...
64,380	,,	June 7	5	5	Torquay and Paignton 5 p.c. Pf	110—115	...	...
500,000	1	...	...	...	United Kingdom Gas Corpn. 4 p.c. 1st Red. Cum. Pref.	19/—21/-	...	19/9—20/3
130,000	Stk.	Aug. 9	8	5	Wakefield Ord.	120—125	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	103—108	...	...
82,000	,,	Aug.	6	6	Weymouth Ord.	103—108	...	...
98,384	,,	Aug. 9	6	6	Wolverhampton 6 p.c. Pref....	120—125	−5	122—123
160,000	,,	June 21	5½	5½	Do. 5½ p.c. Rd. Db	108—113	...	...
90,000	,,	June 21	5	5	York 5 p.c. Red. Deb. ...	105—110	...	...
133,640	,,	July 19	6½	6½	Yorktown (Cam.) 5 p.c Cons.	128—133	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	108—113	...	...
35,000	,,	June 7	5½	5½	Do. 5½ p.c. Deb.... ...	123—128	...	...

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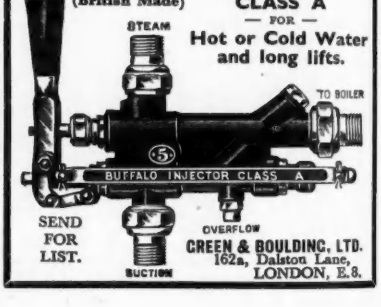

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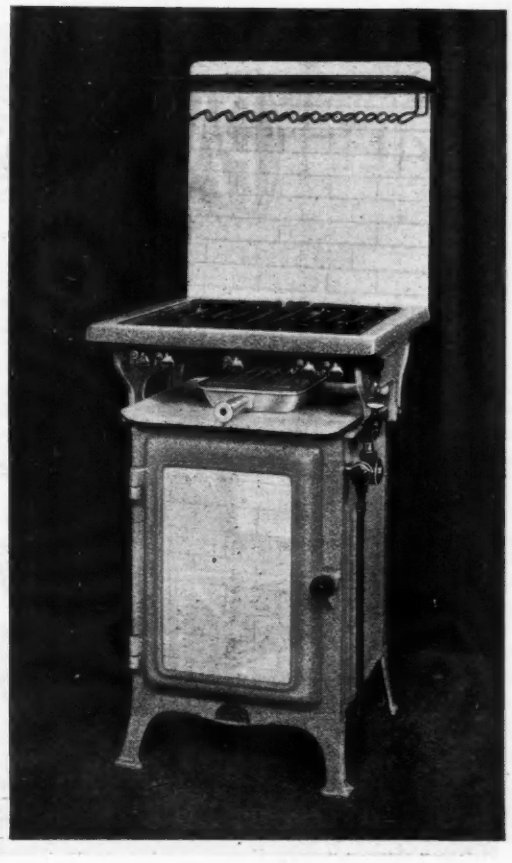

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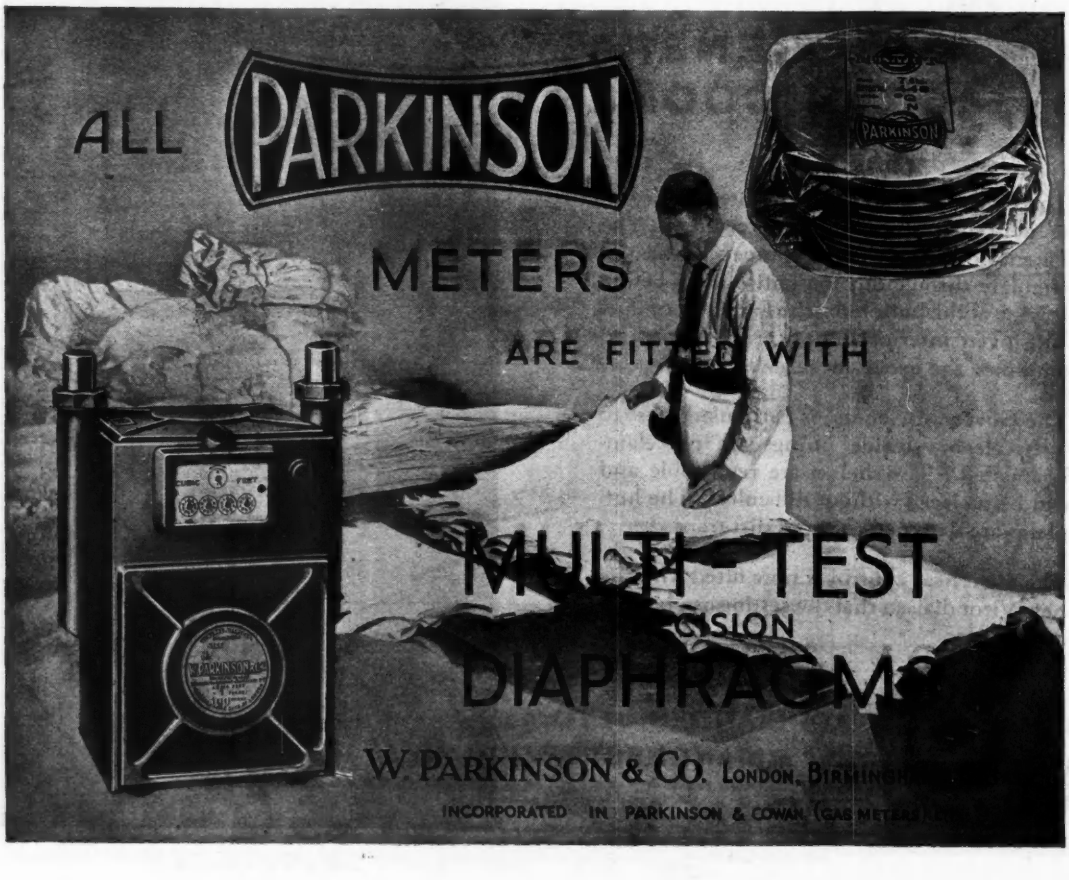
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